THE MANAGEMENT OF

ENERGY SAVINGS PERFORMANCE CONTRACTS (ESPCs)

THESIS

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AFIT/GAQ/ENV/02M-04

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Abstract

Energy Savings Performance Contracts (ESPCs) originated to accomplish several objectives: (1) to meet energy efficiency goals mandated by executive orders and energy policies; (2) to improve federal government facilities using funds allocated for utility bills; and (3) to receive repayment of expenditures through energy savings reflected in reduced utility bills. In ESPCs, the contractor guarantees savings to the federal government agency. 10 CFR 436 limits the time necessary for payback. However, this regulation and others were written prior to the deregulation of utility companies. This theory is based on the underlying premise that the contractor payback is a direct result of the energy savings. The population of study is all of the Air Force ESPCs. The sampling frame used will be the ESPCs and their task orders (TOs) listed in the Air Force Civil Engineering Support Agency (AFCESA) database. The primary unit of analysis will be the individual task order. Data will be collected from interviews, observations, conferences, archives, and other task order related documents. Using case study methodology, contract financial data, energy rates, contract decision memorandums, contract clauses and statements of work, observation, open interviews, and other relevant meetings and materials will be evaluated to determine whether deregulation has an effect on contractor payback and what the effect entails.

THE MANAGEMENT OF ENERGY SAVINGS PERFORMANCE CONTRACTS (ESPCs)

I. Introduction

Utility prices are influenced by the cost of generated power, the availability of transmission lines, and the ease of distribution capabilities, regulated forces, and other factors. The Air Force, under the direction of Congress and the Department of Defense, has adopted energy conservation efforts to combat the effects of rising utility prices. Energy Savings Performance Contracts (ESPCs) are contracts that guarantee the energy conservation efforts will reduce the utility expenditures.

Current Air Force Regional ESPCs have a combined capacity of $1.27 Billion which may be replaced by future ESPCs, given that the Air Force has determined ESPCs to be the preferred method for energy conservation funding (ESPC Intro, 2000). In areas like California where utility rates are skyrocketing and conservation measures achieve guaranteed savings with exponential paybacks, ESPCs may be the best method of combating the rising costs of energy. In areas such as North and South Dakota where deregulation is not yet an issue and utility rates are stable, ESPCs may continue to be an acceptable method to energy conservation. However, in areas like Pennsylvania and Illinois where utility rates have a projected decline, ESPCs may not be the most effective tool in energy conservation.

This study will explore the effects of deregulation on ESPC use. Although the scope of this research is limited to active Air Force installations, the implications of the research should be consistent across all of DoD and other federal installations. Research may find ESPC use should be more actively promoted in those areas of the country where

utility rates may skyrocket and should be terminated, modified, or never activated in those areas of the country where utility rates are projected to decline significantly.

Utility companies had been providing Air Force installations electricity, water, cable, and sewage without fear of competition or termination until the early 1990s when deregulation efforts began. In the last twenty years, two issues gained importance in the Air Force community: (1) energy conservation mandates from the Executive branch and (2) a declining defense budget. Together, these separate issues influenced the formation of Demand Side Management Agreements.

Demand Side Management Agreements (DSMA) were contractual vehicles which permitted installations to simultaneously receive facility improvements and utility bill reductions from their utility service provider. These contracts solved both the problem of achieving conservation requirements and the problem of the budget. Through these contracting instruments, Air Force bases had the power to improve facilities as long as those improvements resulted in significant energy reductions and the power to reduce utility bills. The reductions in utility bills, the results of the facility improvements, were paid to the utility service contractor for the construction performed.

There were advantages and disadvantages to DSMAs. Conveniently, installations were given sole source authority to contract facility improvements and energy reductions with their regulated utility companies. On the other hand, DSMAs were limited to a ten-year estimated payback time, the time allotted for the reduced utility bill to pay for the facility improvement. Furthermore, the contract time, the time allotted for all facility improvements and utility bill reductions, also could not exceed ten years. Consequently, federal acquisition authorities developed Energy Savings Performance Contracts (ESPCs)

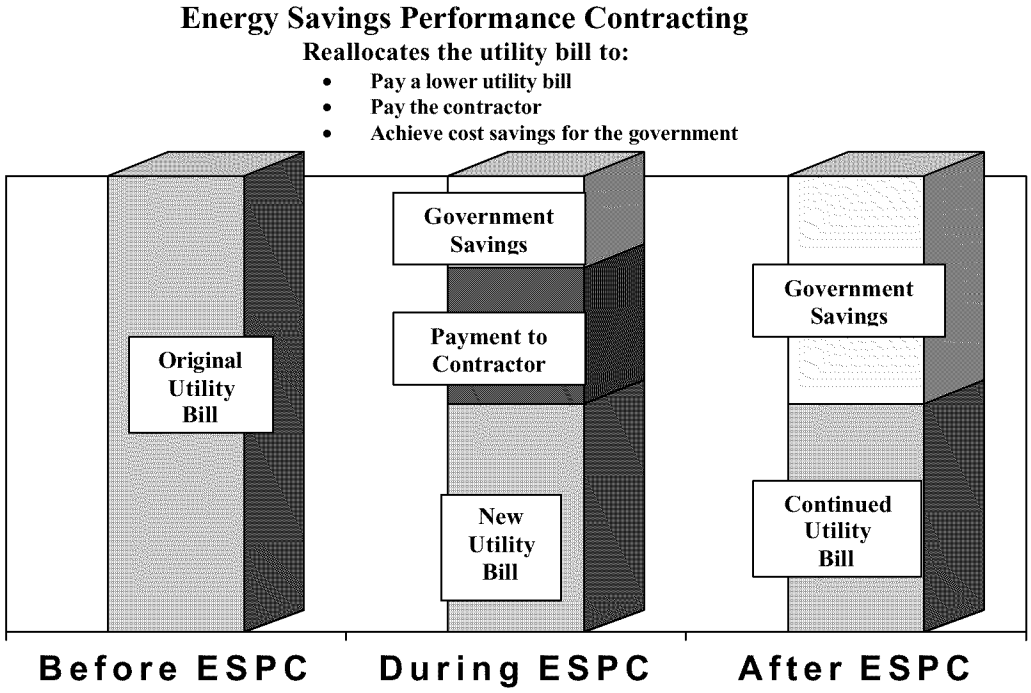
tools. These new contracts, ESPCs, eliminated the contracting officer's authority to enter into a sole source contract for energy savings improvements with the utility service provider. However, ESPCs regulations permitted installations to form contracts up to 25 years with energy service companies. There were no other significant differences between these two contracting instruments.

Background

The Energy Policy Act of 1992 (EPAct of 1992) and Executive Order 13123 mandate energy efficiency goals. The Air Force has mandated that installations use ESPCs as the preferred contract vehicle to achieving these goals. This insistence stems from the benefits of ESPCs which include not only the reduced energy bills but also the improved energy efficiency, the upgraded facilities and equipment, and the alternative financing. ESPCs allow the Air Force to address the two issues mentioned in the introduction, energy reduction mandates and defense financing reductions.

The Federal Energy Management Program (FEMP) offers an efficient overview of the effects of Energy Savings Performance Contracting (FEMP, 2000). FEMP summarizes ESPCs stating that they can be used to "update aging building systems, streamline operations, and train maintenance workers to reduce operating costs" (FEMP, 2000). Whenever a facility needs to update aging equipment with new, more efficient equipment, meet energy reduction goals, conserve fuels, reduce energy consumption, and reduce utility bill expenditures without reducing service, FEMP recommends ESPC usage. In its overview, FEMP directs its readers to a common sense approach useful to the justification of these new contracting tools stating that ESPCs allow agencies to use the savings received for future projects or other base requirements with money that was

previously wasted on inefficient energy usage. Figure 1 was adapted from their overview.



(Adapted from: FEMP, 2000)

Figure 1. Energy Savings Performance Contracting

Energy service companies assume the costs of installing the new equipment, system, or facility upgrade. In the contracting process, the contractor guarantees a fixed amount of savings due to the energy conservation measure. The government allocates money that would have otherwise been obligated to pay inefficient utility systems, to the contractor in a financing arrangement similar to a mortgage; the contractor receives interest and profit on the energy reduction measure employed. In a perfect ESPC arrangement, the government receives more than the guaranteed savings, and in turn, the government receives savings beyond the expenditures paid to the contractor for the conservation measure. Hence, when the contract ends (within a period of 25 years), the

government retains all of the cost reduction benefits of the energy reduction measure without any additional commitment to the contractor.

Due to the effect ESPCs had on the ability of each installation to achieve both energy and financial goals, additional regulations were developed to organize these contracting tools in a manner that would standardize agency use. According to 10 USCA 2865, the Secretary of Defense shall develop a simplified method of contracting ESPCs. Furthermore, 10 USCA 2865 directs all agencies to implement any energy conservation measure that has a 10-year or less payback and these consolidated measures must be achieved within a contract lifespan limited to a 25-year window. This regulation allows for direct negotiation with the ESPC contractors once the utility companies servicing the installations have approved them. The utility company certifies that these contractors have the ability to provide energy conservation services.

The regulation which implements Environmental Protection Act (EPAct) of 1992, 10 CFR 436.30, states that the contract shall guarantee an energy savings, an annual audit to verify guarantees, interest as an allowable cost, and require payments made only from energy funds or related operation and maintenance expenses for the infrastructure improvements. ESPCs allow the government to take advantage of Energy Service Company (ESCO) financing and utility company rebate and incentive programs. Because ESPCs are paid based on guaranteed savings, ESPC training teaches contracting officers to designate a single POC for audit, design, construction, and maintenance.

In October 1986, legislation for shared energy savings contracting began. By February 1994, the first Air Force ESPC was awarded at Randolph AFB, and between September and December 1998, Regional ESPCs (RESPCs) were awarded in the Air

Force with a combined contract capacity of $1.27 Billion. Six different regions covering the United States, its territories, and Korea were established with six Indefinite Delivery, Indefinite Quantity (IDIQ) – single award contracts, one in each region. By December 1998, the first RESPC task order was completed at Travis AFB (ESPC Intro, 2000).

There are six AF ESPC Regional contracting offices (Region 1 (Tyndall AFB, AETC), Region 2 (WPAFB, AFMC), Region 3 (Peterson, AFSPC), Region 4 (Langley, ACC), Region 5 (Travis AFB, AMC), and Region 6 (Randolph AFB, AETC)). The Air Force uses these RESPCs as the primary means to achieve energy mandates. In turn, the ESPC provides a method for contracting services to design, acquire, finance, install, test, operate, maintain, and repair an identified energy or water conservation measure (ESPC Intro, 2000).

AFCESA teaches installations that the contractor payback language should be specific and clear. For example, training states when the government will begin making payments to the ESCO, specifies how the ESCOs share is to be divided, and orders annual reconciliation to ensure guaranteed savings (ESPC Intro, 2000). This section is crucial to this thesis, because it allows guarantee shortfalls to be treated as credits on the next monthly invoice and perhaps extends the life of the ESPC over the 10-year simple payback window. Additionally, this section gives the Contracting Officer discretion regarding how this shortfall will be paid to the government if the credit is not desired. The contracting language used could potentially allow task order payback time to exceed the maximum number of years originally specified in the contract. In order to calculate the guaranteed savings and payback shown in Figure 1, training states "…b. Payment will be calculated as shown in the following example:

(1) ESCO estimates a savings of $140,000/year, and

(2) ESCO guarantees a savings of $120,000/year

(3) ESCO's monthly payment is determined by:

$120,000 (guaranteed savings) ÷ 12 months = $10,000/month" (ESPC Intro, 2000). In periods when the government receives all or more of its guaranteed savings, this payment calculation is appropriate. During those periods when the government does not receive the energy savings and financial gains promised from the energy conservation effort, this payment calculation might not be sufficient; the government may need other measures or contract clauses for savings shortfalls.

Problem Statement

ESPCs, performance contracts for energy savings, originated to accomplish several objectives: (1) to meet energy efficiency goals mandated by executive orders and energy policies; (2) to improve federal government facilities using funds allocated for utility bills; and (3) to receive repayment of expenditures through energy savings reflected in reduced utility bills (FEMP, 2000). Each year, the contract states government savings are guaranteed, and unrealized savings will be credited back to the government. In turn, if the installation did not receive its savings within the contract milestone, the installation would eventually realize these savings due to the credits applied each year per the language of the contract.

Before ESPC, installations needed to allocate MILCON funds for improvements. After ESPC usage had been approved, Operation and Maintenance funding allocated for utilities enabled agencies to receive facility improvements provided the energy savings equaled or exceed the cost of expenditures. Yet, there are at least two known

uncertainties: technical risk and rate risk. The utility industry performs an expert evaluation of the ESCO minimizing the technical risk for the government. However, the remaining uncertainty provides the focus of this thesis effort. If deregulation does have an impact on ESPC, then there may be a risk as seen in Figure 2.

	High Risk ESPCs	**Low Risk ESPCs**
Deregulation	Prices Decrease	N/A
***Without* Deregulation**	Prices Constant/Decrease	Prices Constant/Increase

Figure 2. The Risk of Deregulation and ESPC

In theory, deregulation decreases prices for consumers through increased competition (Goffman, 1995:33). Successfully deregulated areas should, in theory, experience smaller utility bills, ceteris per bus. However, with ESPC, the ESCO guarantees that its energy conservation measure will decrease the utility bill and generate a savings for the government, ceteris per bus. Yet, if deregulation influenced the savings of ESPC, then the payback time may lengthen. If deregulation is decreasing utility bills, then the energy conservation measure will take longer to achieve net return on the investment; in other words, the ESPC government savings process slows. Furthermore, the payback time may be extended past the regulated time permitted as payments are credited to the government each year and not applied to the total contractor bill. If deregulation is successful, then utility rates will decrease and the government will If the utility rates increase, the utility expenditures increase (ceteris per bus) and the energy conservation measure performed by the ESPC should provide high savings for the government. In contrast, if the utility expenditures decrease, the utility expenditures

decrease (ceteris per bus) and the energy conservation measure performed by the ESPC may provide less than the guaranteed savings for the government.

Consequently, ESPCs may be risky contracting instruments in certain regions of the country. Already, Californian and Texas-based utility companies have filed bankruptcy; communities affected by these and other providers are feeling the strain of high utility rates and frequent outages. Other service companies, such as those in Pennsylvania and Ohio, project success and estimate that standard utility bills will decrease significantly. Yet, each deregulating state can only estimate the probability of its program's success. The instability in the utility industry creates uncertainty on the effects of deregulation, and these effects may have an impact on ESPCs ability to guarantee savings, thus preventing repayment of expenditures due to the residual utility bills and defeating objective three of ESPC.

Research Question

This thesis seeks to discover the significant factors which affect ESPCs placing emphasis on deregulation as a potential effect during the case analysis. Additionally, due to the differences in regions, these effects may be different in different areas of the country. In other words, some regions are primarily rural; others are mostly urban. There may also be differences in climate, ESPC monitoring, ESPC interest rates, and regulated utility status that affect the savings. These assumptions raise several questions. Does deregulation in fact affect ESPCs? What are the variables that affect ESPCs and what are the projected effects? Is there variance between regions in the variables relevant to ESPCs?

Methodology

This study conducts a qualitative case study analysis of ESPCs. To properly access the current and future health of ESPCs, research provides an in-depth analysis of five installations, each with task orders (TOs) in various phases of completion. Each individual installation is treated as a case, and within case analysis was performed to analyze possible factors that may compromise success while concentrating on deregulation as a possible factor. Success is determined to be the Task Order's ability to achieve guaranteed energy cost savings within the payback period originally specified. Afterwards, TOs analysis compares perceived successes, failures, and issues and matches common characteristics to identify any patterns.

Summary

This chapter offered a brief picture of the history of ESPCs. Additionally, background information on the rationale and the regulation behind the formation of ESPCs was provided to give a foundation to the research questions and assumptions. Perhaps the greatest relevance to this research is its ability to address the future of energy conservation measures and how these measures should be executed.

II. Literature Review

Introduction

This chapter provides a literature review of energy use, Energy Savings Performance Contract (ESPC) regulations, scenario-based planning, deregulation, and the utility industry. When reviewing literature on energy, focus is made on the broad concept of energy, energy savings as stated in regulation, and ESPC definition and history. After describing ESPCs, scenario-based planning illustrates which level of uncertainty ESPCs must plan against. In the deregulation segment, generalities and examples offer a forecast on the impact of utility deregulation. The utility industry analysis presents a strategic look at the industry's competitive forces.

Energy

David Rose stated that energy is not a material commodity; it is an abstract concept invented by physical scientists in the 19th century to describe quantitatively a wide variety of natural phenomenon (Rose, 1986:5). Nevertheless, this abstract concept has value, and this value lies in its efficient use. Whether utilities are government owned or privatized, energy is recognized as being a public good, tied to the public welfare. Since energy is a part of the fabric of civilization, both the people and the society in which they live need and use energy. Energy is 10 to 15% of the Gross National Product of the United States and many other countries (Rose, 1986:x). Energy, this essential resource, intertwines with nearly every personal and professional enterprise. By studying the growth of energy, history is studied. Yet, energy is not easily analyzable or deterministic. As a resource, its availability is not certain; its demand is not known. Energy projections in 1970 for the energy needs of 1990 were ridiculously high.

However, what has come to be realized about energy is critical. Its supply is limited, its demand is growing, and its efficient use is essential.

Energy flows from a primary resource such as coal or petroleum. This resource is extracted and transported to a central conversion facility such as an electric power plant or an oil refinery. Through avenues such as electric power lines and gas pipelines, the energy goes through the stage of transmission and distribution to be used by the end customer (Rose, 1986:7).

As Rose explains, energy is obtained from a variety of resources to provide the light, heat, and power needs of a society. The principal fossil fuels – petroleum, coal, natural gas, and lignite – are nonrenewable resources; supply is therefore finite. Non-fuel energy sources – radioactive elements, wastes, water, wind, geothermal, biomass, and solar heat – presently do not supply much of society's demands. However, these non-fuel resources may become of greater importance as conservation efforts fail to address the realities of limited fossil fuel supply (Parker, 1981:p).

United States energy consumption has risen but at different rates for different periods and has decreased somewhat in certain fuel segments. In 1920, wood was the largest supply of fuel, but this resource declined to nearly zero by 1980. Similarly, coal reached its peak in 1910 and began its own decline. However, rather than coal's resource use declining to zero, coal consumption maintained a steady 20 percent thereafter, suffering only minor increases and decreases in usage rates. On the other hand, consumption of petroleum and natural gas has continued to increase since 1948. Natural gas had a period of reduced consumption in the mid-1970's but began to increase again. Across periods, the industrial segment has been the largest major economic sector in

energy consumption with 35 to 40 percent consumption rates. Residential is the second largest major economic sector with 17 to 21 percent consumption rates, and commercial follows third with 15 to 17 percent rates. Automotive and other transportation are the remaining major economic sectors with 10 to 15 percent consumption rates each. Overall, energy consumption increased 3.5 percent each year up until 1973. After the energy crisis scare, consumption began to increase at less than one percent each year thereafter. In fact, the industrial sector experienced decreased consumption rates during periods in the late 1970s and in the mid 1980s. In sum, energy conservation has created a push towards energy efficiency, and this movement has been on a consistent upswing (Parker, 1981). Consumption rates are illustrated in Figure 3.

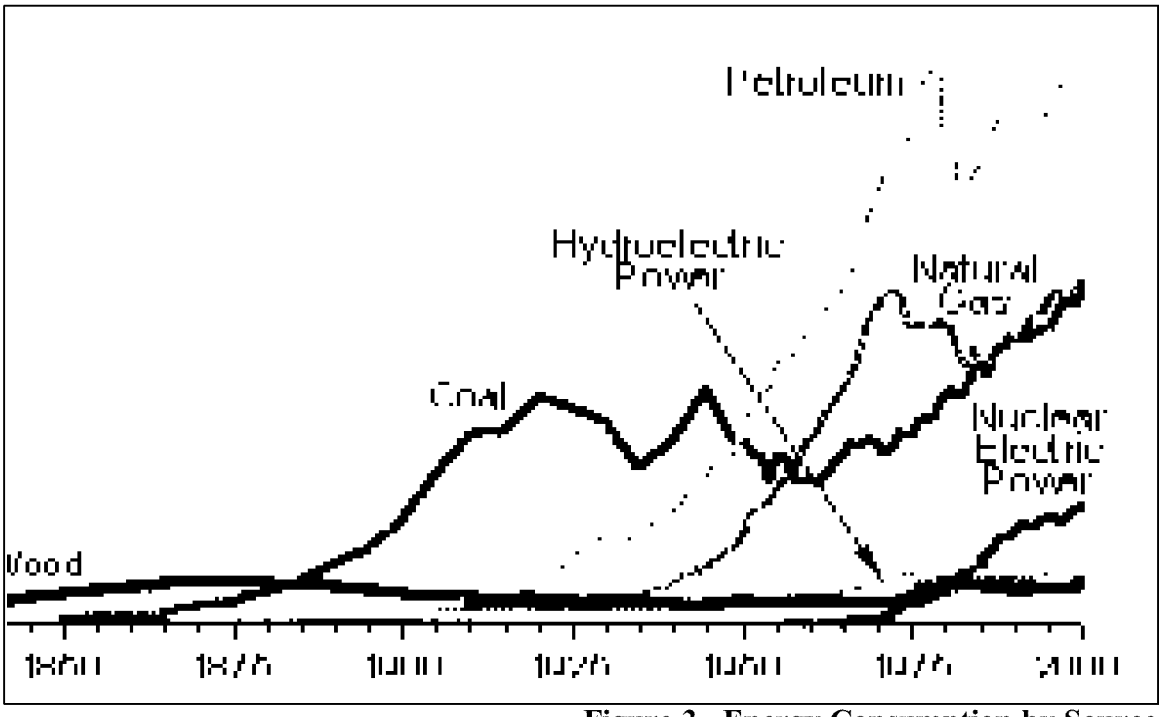


Figure 3. Energy Consumption by Source 1860-2000 (Quadrillion BTU)
(Dept of Energy html)

Energy Savings Regulations

Conservation of energy saves the supply of the natural resource and the supply of the societal pocketbook. Like the fuel, the availability of funds is limited. Although money may be generated, its value is made more precious by restricting its supply. The United States has mandated many energy reduction goals in an effort to conserve both energy and financial resources. The Energy Policy Act of 1992 (EPAct of 1992) amends such previous acts such as the Energy Conservation and Production Act and the Public Utility Regulatory Policies Act of 1978. This act, also known as Public Law 102-486 is provided to promote improved energy efficiency. There are certain terms defined in this law that will be used in this research. In Title I, Energy Efficiency, the term "Federal Building Energy Standards" means that "energy consumption objectives (are) to be met without specification of the methods, materials, or equipment to be employed in achieving those objectives, but including statements of the requirements, criteria, and evaluation methods to be used" (EPAct, 1992: Title I). This statement made in Subtitle A, Buildings, in Section 101, Building Energy Efficiency Standards, may be rephrased to state that Congress has determined it not necessary to state the methods used to conserve energy. Instead, Congress mandates only documentation of the requirements and solutions. However, Subtitle F, Federal Agency Energy Management, had determined it necessary to state the methods that will be used to conserve energy. Section 152, Federal Energy Management Amendments, Energy Management Requirement for Federal Agencies, states that "not later than January 1, 2005, each agency shall to the maximum extent practicable install in Federal buildings owned by the United States all energy and

water conservation measures with payback periods less than 10 years, as determined by using methods and procedures developed pursuant to section 544" (EPAct, 1992: Title I). This section goes on further to state that The Secretary, the Secretary of Defense, and the Administrator of General Services shall identify which projects will allow payback periods in order to take maximum advantage of ESPCs. ESPCs are contracts mandated under Title VIII of the Energy Policy Act of 1992. This mandate is to promote financing to reduce the direct costs to the Government while providing investment into creating efficient utilities.

The Title VIII specified is the law that Congress advises the Secretary of Defense to utilize. In turn, although Congress does not state the methods to be used in energy conservation efforts, Congress does advise the Secretary, Secretary of Defense, and the Administrator of General Services to use the contracts specified by Title VIII. Title VIII, Energy Savings Performance Contracts, advises these contract vehicles to promote cost effective technologies. This program is to be used to "increase building energy efficiency, while maintaining affordability, by the year 2005" (EPAct, 1992: Title XX).

Before discussing ESPCs, other aspects in the EPAct of 1992 need to be addressed. In regulated states, EPAct of 1992 determined that allowable rates charged by regulated utilities reflect profitable energy conservation efforts and other demand management measures. Section 115 defines "demand side management" as energy conservation, energy efficiency, and load management techniques. Recall from Chapter One in this thesis that Demand Side Management Agreements were the preferred contract vehicles prior to the implementation of ESPCs. The term ESPC is expanded to include

energy efficient products contracted in regulated and non-regulated states with independent contractors working with utility companies. The primary differences between the two contract vehicles are the payback periods allowed and the contractor employed. In Demand Side Management Agreements, a federal facility contracted directly with the utility company with a payback period limited to 10 years. In ESPCs, federal procurement offices contract with independent contractors to improve energy efficiency. These independent contractors are separate corporations from the utility companies. The overall contract payback period, using a combination of all payback projects, may reach up to 25 years with each individual conservation effort still limited by the original 10-year payback stipulation.

Section 111 of the EPAct of 1992 addresses regulated utilities and requires regulators to link utility revenues to utility effectiveness. This section requires that the rates are a direct reflection of implementing cost-effective energy conservation programs. This same section goes on further to state that the regulated utility performance shall not be affected by reductions in retail sales volume. In sum, regulated rates and regulated performance are mandated to be results of energy efficient, cost reducing, demand management programs. Deregulated utility companies will be discussed in a later section.

The EPAct of 1992 provided guidance for all federal, state, and local agencies; 10 U.S.C. 2865, Energy Savings at Military Installations, provides guidance for the Department of Defense (DoD) for achieving energy performance goals. In addition to a restatement of EPAct of 1992 guidance, this regulation provides for the use of the

Regional ESPC vehicles which allow installations to use existing contracts in an effort to simplify and accelerate the use of ESPCs. Also, this regulation specifies the manner in which DoD funds will be apportioned. Furthermore, 10 U.S.C. 2865 Part B, Use of Energy Cost Savings, states that one-third of these savings shall remain available for obligation of additional energy conservation measures. Additionally, one-third shall remain available for improvements to existing military family housing units, minor quality of life construction projects, and any morale, welfare, or recreation facility or service.

Energy Savings Performance Contracts

The Energy Policy Act of 1992 authorized and recommended ESPCs use to the maximum extent possible. ESPC usage allows Federal funds to be used elsewhere; ESPCs are contract vehicles which allow third party financing. The energy service company assumes the capital cost of the energy conservation efforts. The company guarantees a fixed amount of energy cost savings throughout the life of the contract and receives its payment directly from those savings. Through ESPCs, agencies, specifically Air Force installations, achieve three benefits. First, the EPAct of 1992 mandated a 35 percent reduction in energy consumption (compared with energy levels in 1985) in all federal buildings by 2010 (FEMP, 2000). ESPC conservation projects assist the federal agencies in achieving this requirement. Second, the Air Force has limited funding on energy conservation efforts; thus, ESPC contractors provide the up-front capital costs. Lastly, the energy service company forecasts energy cost savings and guarantees a smaller portion of these forecasted savings. Through ESPCs, the company receives

payment directly from the savings, but the government receives the remainder of these savings for itself.

The Code of Federal Regulations (CFR) provides guidelines for ESPC contracting. In 10 CFR 436, an annual energy audit is required. This audit must include a verification of the achievement of energy cost savings and energy unit savings guaranteed resulting from the ESPC. This audit can also be utilized as a determination of whether an adjustment to the energy baseline is necessary. An adjustment to the baseline is justified if the conditions, which may affect the cost savings, were beyond the contractor's control. For example, an adjustment may be justified if the installation added a new wing, which increased the energy usage of each facility due to the additional personnel and mission requirements. This audit is a survey that includes a detailed analysis of energy cost savings and energy unit savings potential, building conditions, energy consuming equipment, and hours of use for the purposes of confirming the original contractor proposals in the technical and price categories, which were based on a preliminary energy survey. This audit is generally performed by contractor personnel and verified by Base Civil Engineers.

There are several terms defined by 10 CFR 436 that will be used in this research effort. Specifically, 10 CFR 436 defines ESPCs as "contracts which provide for the performance of services for the design, acquisition, installation, testing, operation, and, where appropriate, maintenance and repair of an identified energy conservation measure or series of measures at one or more locations." Other terms are also defined; 10 CFR 436 defines the energy baseline as the amount of energy that would be consumed

annually without implementation of energy conservation measures. This baseline uses historical metered data, engineering calculations, submetering of buildings, load simulations models, statistical regression, or a combination of methods. Additionally, 10 CFR 436 defines energy conservation measures as any measure which improves energy efficiency. These measures are lifecycle cost effective and may involve energy conservation, cogeneration facilities, renewable energy sources, improvements in operation and maintenance efficiencies, or retrofit activities. Energy cost savings are reductions in energy costs and related operation and maintenance expenses from the base cost established in the contract.

Other than defined terms, 10 CFR 436 also provides for a two-step process which allows agencies to obtain proposals initially on estimated energy savings with contract award conditioned on confirmation through a detailed energy survey. This initial proposal may detail life cycle cost energy conservation measures. The second stage is an award of the initial proposal in its entire, partial, or revised form. The final ESPCs are firm fixed price contracts that may be entered for a period not to exceed 25 years. There are mandatory requirements that must be included in each ESPC. These include the annual energy audit, the guarantee of energy cost savings, but also an establishment of payment schedules reflecting this guarantee and provisions for third party financing.

Significant to this research effort are the conditions for payment spelled out in the regulation. Section 436.36 of the CFR states that any amount paid by a Federal agency pursuant to any ESPC may be paid only from funds appropriated for utility bill expenses and operation and maintenance expenses that would have been incurred had the ESPC

not existed. The contractor may not obtain payment unless savings are realized. However, the regulation states that the amount of funds that a Federal agency would have paid prior to ESPCs is equal to the energy baseline in the ESPC itself and any related operations and maintenance cost prior to the ESPC (and adjusted for price indices).

Just as 10 CFR 436 provides general guidance for ESPCs, AFCESA offers Air Force bases specific guidance on how to implement a regional ESPC task order.

> The Air Force Civil Engineer Support Agency (AFCESA) has assisted each of six lead bases to award a RESPC. These six contracts afford most Air Force activities access to an Air Force RESPC. AFCESA is the gatekeeper for bases wanting to participate in a RESPC. The lead base contracting office will delegate ordering authority to other contracting offices within their region after AFCESA has approved the base's participation. Following the procedures below is required to obtain and keep the authority to use an Air Force RESPC. These procedures are applicable for initial acceptance into a RESPC and the issuance of every task order under that ESPC. NOTE: The agreement between RESPC lead bases and AFCESA/CESM is that AFCESA will handle as much of the interface/questions with other installations as possible. This is to reduce the overhead/workload on the lead base. (Implementation Procedures: November 1998)

When an installation generates interest to perform an Energy Savings Performance Project, the installation Contracting Officer forwards a memorandum, after coordinating with base civil engineering, to HQ AFCESA/CES stating their interest in using an RESPC. After this memorandum is received HQ AFCESA/CES schedules and conducts training for the installation's contracting and engineering personnel. After training, the Regional Contracting Officer (RCO) receives notification from AFCESA that training has been received and the requesting installation is approved to participate in an RESPC. At that time, the RCO sends a memorandum to the installation's applicable contracting officer delegating ordering authority with a copy of the RESPC and procedures. Once this is done, the installation Contracting Officer invites the Energy Service Company (ESCO) to a pre-performance meeting to discuss the installation's requirements. After

this meeting, the contracting officer may direct the ESCO to perform a Phase I – Preliminary Site Survey. During this entire process, AFCESA, and not the RCO, is responsible for answering all questions and assuring that the installation-contracting officer has maintained compliance. Once the ESCO provides the Phase I report, the base civil engineers review and approve with the assistance of AFCESA if desired, and the base-contracting officer informs the RCO and AFCESA of the potential project dollar amount and the intent to proceed to Phase II – Facility Energy Audit and Economic Analysis. The RCO then determines if there is adequate headroom on the RESPC, and AFCESA issues a tracking number for the installation's task order. If headroom exists and the tracking number is issued, the installation's contracting officer, then directs the ESCO in writing to perform Phase II. Once again, the base civil engineers must review and approve the Phase II report. The contracting officer must notify the RCO and AFCESA if the original Phase I dollar amounts have been exceeded and must submit a memorandum for Congressional Notification if the task order exceeds $750 thousand. Once notification is complete, the contracting officer may issue the task order for Phase II to the ESCO (Implementation Procedures: November 1998). Overall, it is AFCESA who provides training, oversight, and guidance to Air Force installations on ESPCs.

The Federal Energy Management Program performed a case study on the 1992 ESPC used to upgrade the infrastructure in the Statute of Liberty monument (FEMP, 2000). The energy conservation measures included energy efficient lighting, variable speed drives, and energy management control systems. Other than the lighting, the conservation measures are computer controlled at a power plant. Additionally, the

contractor is responsible for equipment maintenance during the 15-year life of the contract. These benefits were realized without capital costs incurred by the Department of Energy (DOE), the project initiator. The lessons learned from this project helped other agencies reform their individual ESPC guidelines. For instance, the DOE discovered that the unique requirements of an ESPC and the limited technical and contracting staff resulted in a prolonged implementation period. They also discovered a necessity to negotiate any considerations prior to contract award to ensure facility needs are met. A significant lesson was that of restricted scope, this particular ESPC made no improvements to the exterior lighting of the monument. Although the scope of this project was limited and the initiator DOE, this case represents an example of the historical use of ESPCs (FEMP, 2000).

Scenario-Based Planning

Courtney et al. (1997) suggest that there are four levels of uncertainty that continues to exist even after a professional strategic analysis has been performed (Courtney, 1997:82). These uncertainties, residual uncertainties, exist; because once the analysis of a market has been conducted, certain unknowns remain. For example, when evaluating the utility industry for ESPCs, there remains uncertainty of which states may adopt deregulation and when it would be adopted. There also remains uncertainty in the utility market for future utility prices across the country. However, it is the level of uncertainty that should be of consequence to managers and decision makers.

Courtney et al. (1997) suggest that at *Level One: A Clear Enough Future* the uncertainty is insignificant and predictions are precise (Courtney, 1997:82). For

example, if an established trucking company wished to predict the affect of purchasing a new truck, the uncertainty of the next quarter earnings, the sale of the old truck, and the impact on net profit are predictions that can be made with enough certainty to give trucking managers a clear vision of the impact. Entering into ESPCs cannot be placed into such a category of minor uncertainties. Level one uncertainty implies that the predictions are precise. There were too many variables that impacted these ESPC contracts. ESPCs were more complex; these were a new type of contracting instrument affecting the financial community, the contracting community, the civil engineers, the utility companies, and an energy contractor. All of those entities had to work together to create a new arrangement in an environment affected by fluctuating utility prices, a need for training, and a need for trust or guarantees between the contractor and the government for savings and payback. Yet, *Level Two: Alternative Future Uncertainties,* in which there are pending conditions that affect the outcomes, do not fit the ESPC situation as well (Courtney, 1997:83). Although an example of a Level Two uncertainty would be a decision maker faced with a decision before legislation was passed, ESPCs did not fit this category. ESPCs had too many variables and uncertainties as stated previously to be a potential candidate for Level Two uncertainties.

There may be some debate as to whether ESPCs are best described as *Level Three: A Range of Futures* or *Level Four: True Ambiguity* uncertainty (Courtney, 1997:83-84). In Level Three uncertainties, there are no distinct alternatives; in other words, there is a range of possible outcomes. When American firms first began entering the South American market, they were faced with Level Three uncertainties – market

share gain, government cooperation, political unrest, etc. In Level Four uncertainties, it is impossible to identify all of the variables affecting the environment. Furthermore, the variables identified have possibilities in which it is impossible to predict the range. One could argue that ESPCs fall into Level Four ambiguity. The uncertainties were many and ranged across the five constructs studied in this thesis effort: deregulation, utility prices, savings, contract management, and contractor performance; these constructs are described in the methodology section of this thesis. An example of uncertainty within the constructs includes:

- Would operational contracting offices be able to understand, execute, and control a new type of contracting instrument? *Contract Management*
- Would operational civil engineering squadrons be equipped to read, write, measure, monitor, and inspect the ESPC contracts and results? *Contract Management*
- Will the ESPC classroom training be sufficient for operational bases to understand these new instruments? *Contract Management*
- How will deregulation affect the payback of ESPCs? ***Deregulation*** Will it accelerate or slow contractor payback? How will this affect interest rates? ***Savings***
- How will operational bases be equipped to handle ESPC contractors with performance problems or other issues? ***Contract Management/Contractor Performance*** How will the Termination Schedule affect contract management decisions? ***Contract Management/Contractor Performance***
- Is the measuring and verification (M&V) significant to ensure government savings? ***Savings*** Including M&V on un-metered facilities? ***Savings*** How does the government ensure a for-profit business that submits the annual M&V report is promoting the government's not-for-profit best interest? ***Contractor Performance***
- Will the utility prices actually decrease as a result of deregulation within the 20-year payback window? ***Utility Prices/Deregulation***

If ESPCs fit into Level Four or Level Three uncertainty, the Air Force can adapt the *shaping* strategy for new ESPCS and new contracting instruments (Courtney, 1997:88). Courtney et al. (1997) suggest that there are three strategies: *shaping*, *adapting*, and *reserving the right to play*. In many ways, the Air Force actively executes the shaping strategy currently using its litigation team to speak to state legislation and federal commission on utility issues. Because of Federal Acquisition Regulation, the Air

Force may not use the shaping strategy to influence contractors in many ways. Yet, contractors may still be shaped in a manner to allow more flexibility such that task orders can be tracked and adapted as conditions changed. At present, although these contracts were a new type of instrument, they are still standard rigid contract documents. Moreover, the government's flexibility of termination is limited in the high cost of the termination schedule. Yet, with a fully executed shaping strategy, the Air Force attempts to shape the legislation, the base operational environment, and the contractor quality. The only alternative strategy Courtney et al. (1997) suggests at these two levels is *reserving the right to play* – a risky strategy because of the loss of possible returns of taking the gamble (Courtney, 1997:88).

Deregulation

Although ESPCs are a relatively new vehicle employed to reduce energy and budgetary resources, deregulation is a concept with history in different industries and at different levels. Yet, a trend can be found in the study of deregulation; deregulation and regulation are cyclical as seen in Figure 4. Paul Demsey refers to this cycle as the *Revolving Door* (Demsey, 1996). Regulation begins as the industry develops and the government seeks to protect the customer. Deregulation takes

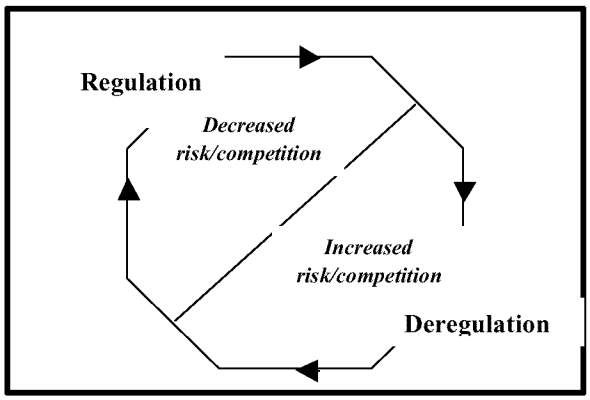


Figure 4. Cycle of Regulation and Deregulation

effect as legislation releases the industry to promote competition in an effort to promote productivity, increase competition and decrease costs. However, regulation becomes a reality again as the protection for the consumer must be balanced with free market competition.

The utility industry is beginning its first phase of deregulation, but industries such as banking, insurance, mass transit, and airlines have experienced a life cycle portrayed by a stage of growth and maturity. Once this stage is complete, governments begin to implement measures to limit consumer risk and decrease societal costs. However, these regulations tend to become too stringent, and restricted competition coupled with inefficient operation results. In turn, the third stage is one of deregulation, an economic freedom for the industry actors to exercise greater control over operations and for others to enter and to exit the market with greater ease. This stage opens the market for increased competition and the possibility of decreased prices for the consumer. Yet, this freedom does not necessarily result in the success predicted by analysts. Hence, regulations are implemented once more to protect the consumers and to promote ideal business practices.

Deregulation: Defined, Success, and Failure

Deregulation can be defined as the restructuring of an industry to promote competition and reduce prices (Goffman, 1995:33). In regards to the utility industry, deregulation implies that consumers may choose energy suppliers (Jarman, 2001). "That idea works in favor of customers, as long as there is a surplus of energy and suppliers drive their prices down to compete for customers (Jarman, 2001)." In deregulation,

legislation becomes less restrictive over individual business practices allowing businesses a greater ability to control costs and generate revenue. A deregulated market creates a policy advocating competition. If successful, competition increases, prices decrease, and consumers benefit from the legislative reform. Deregulation may be determined unsuccessful when legislation determines the need for re-regulation or when prices increase instead of decrease as a result of new competition initiatives. This section looks at the history of deregulation in the financial, mass transit, and airline industries and compares their histories to potential future of the utility industry deregulation.

Financial Industries

The banking and insurance industries are examples of this cycle of regulation, deregulation, and re-regulation. The United States financial service industry experienced increased government regulation in the 1930s (Gart, 1994:8). Until the late 1970s, regulations became stricter and more numerous (Gart, 1994:81). It was not until the 1980s and early 1990 that deregulation removed prior stringent requirements set forth by Congress (Gart, 1994, 81). Shortly after this period, some in Congress thought that additional powers given to these industries would create additional risks and additional ways to lose money (Klein, 1995, 2). In fact, new regulations were enacted after discussion on numerous banking institution failures.

"The stock market crash of 1929, thousands of bank failures, and the ensuing depression brought cries of recrimination from elected officials and government appointees and feelings of betrayal from the public" (Gart, 1994, 31). Although it was never established that the bank failures were a consequence of underwriting or ownership

of securities, public perceptions were strong enough to obtain government reform. Because the public perceived the bank failures to be a result of "over banking", excessively lax chartering policy, chartering practice became a significant part of the reform. Federal and state agencies regulated bank market entry, geographical location and product lines, deposit insurance and bank balance sheets, and service prices such as rate ceilings on bank deposits. From 1960 to 1975, additional regulations were made to promote social responsibility and consumer protection. These regulations are often classified as economic regulations, safety regulation, consumer information, and protection regulation (Gart, 1994:32).

These regulations, although later deemed outmoded, prevented many future bank failures. "The absence of old-fashioned banking panics in the post-World war II period was a great achievement; it has probably contributed more to the general welfare than most of the widely touted "welfare programs" (Gart, 1994:55). Yet, most of the bank runs prior to 1934 were geographically contained and limited to a small number of banks. Between 1865 and 1933, depositor's losses averaged only .78 percent of total deposits during crisis years for bank failures. The primary reason for this small average loss is due to the maintenance of high capital levels by banks. This capital acted as a buffer against high loan and security losses; fewer banks failed. The two worst years for bank failures, 1988 and 1989, experienced losses of approximately .25 percent – in percentage terms, only one-third of the losses experienced during the dozen crisis years between 1865 and 1933. By contrast, during the period of the Great Depression, 1930 – 1933, 20 percent of the deposits were lost at failed banks (Gart, 1994:55). Even though bank runs

are rare and infrequent, their effects on the local and national economy can be devastating in the large costs results to the U.S. economy.

Before 1865, Indiana, Ohio, and Iowa required state chartered banks to guarantee each other's liabilities. This promoted monitoring and control of banks by other banks and prevented any losses to consumers, because individual banks ensured that other banks were managed properly. While this system was in practice, these three states experienced only a few bank failures and no lost deposits; during the same period, other states experienced failures and losses that were common. This system illustrates a feasible method in regulating an industry through peer monitoring and control rather than government intervention (Gart, 1994:56). However, the government has consistently been the police for reform whether this reform is federal, state, or private. As Klein notes, "regulation is instituted to correct a market failure, the nature of that failure will influence the form of the governmental response" or the amount of legislation, re-regulation (Klein, 1995:9).

Congress believed that increased deregulation for mainframe banks could lead banks to repeat the Savings and Loans (S&L) crisis in the 1980s. On the other hand, deregulations would enable banks to obtain additional powers for capital generation and consequent buffers for bailouts (Gart, 1994:97). Yet, the debate moves back and forth with sound arguments on both sides. Robert Litan of the Brookings Institute believed legislation would strengthen banks over time. New law could force regulators to work quickly in fixing the problem of undercapitalized banks. Banks could be closed when their capital falls below 2 percent of assets rather than waiting until the bank fails.

Government's slow reactions to bad bank situations could be prevented through regulation requiring suspended dividend payments and management changes as a bank's capital declines. However, Leonora Cross, Office of Comptroller of Currency (OCC) official, uses BankAmerica as an example of the potential harmful nature of regulation. She states that if tougher standards had been in place when Bank America experienced problems in the mid-1980s, BankAmerica would have experienced a bank failure. Yet, BankAmerica is now one of the best run and most profitable banks in the U. S. economy (Gart, 1994:99).

The same controversy lies within the insurance industry. Most agree that insurance is an industry that affects the public interest and that government supervision should protect the public with the least interference to corporate operations. A May 1991 General Accounting Office (GAO) study found that state officials are not doing a proper job policing the insurance industry (GAO, 1991). Consequently, choices have been discussed - federal regulation or national standards enforced by state regulators. The GAO favored national standards. Alan Gart warns insurance regulators not to repeat the S&L fiasco. He states that lessons should be learned from the thrift crisis and regulatory forbearance, which raised the cost of resolving the S&L crisis and which should not be duplicated in the insurance industry (Gart, 1994:190). On one hand, insurance companies are more solvent than the S&Ls and banks. On the other, insurance companies are making the same bad investments that the other financial institutions had made and are experiencing serious problems (Klein, 1995:6-7). In sum, the financial industry needs both more deregulation and re-regulation. There is a need for deregulation to allow

nationwide banking and the intermingling of commercial banking to increase capital. There is also a need for re-regulation for higher risk-based premiums, higher loan-to-value ratios in real estate lending, reduced maximum lending limits, and uniform safer investment guidelines (Gart, 1994:385).

The banking industry directly affects the financial resources of the nation's economy just as the utility industry directly affects the energy supply. The similarities between these two industries are numerous. Both industries deal with critical resources, which directly affect the economic well being of the society. Both need some monitoring and control to make efficient use of their reserves. Both need freedom in order to generate the capital necessary. The banking industry needs capital as a buffer, but so does the utility industry, which needs capital both as a buffer during economic losses and for investment in energy conservation and load management measures. However, deregulation created many risks for the consumers; in turn, new regulations were necessary in order to protect consumers while still allowing firms the ability to generate capital and while still allowing the industry as a whole the ability to promote competition.

Mass Transit Industry

Mark Alan Hughes argues for deregulation of the mass transit agencies. Stating that deregulation removes constraints on innovation and efficiency, Hughes criticizes public intolerance and media influence on risk-avoidance leadership, which reduces experimentation and creative management developments. The culture of coping versus innovating is prevalent in government agencies, which are constantly under the public's watchful eye. Consequently, Hughes proposes the removal of legislation created by state

and federal agencies such as the Federal Transit Authority, the Department of Transportation, Interstate Commerce Commission, Office of Management and Budget, and the Southeastern Pennsylvania Transportation Authority (DiIulio, 1994:236-247).

Transportation policy developed with the increased use of the automobile and the massive investment in road after World War II (DiIulio, 1994:239). Regulation of the transportation industry began with the adoption of the Federal Defense Highway Act of 1954. Just as in the banking industry, federal involvement began in reaction to a crisis. After the interstate highway system grew in popularity, passenger rail systems became regarded as archaic. The private industry was on the decline. In fact, regulation in 1958 made it easier for railroads to eliminate much of their passenger service. The day that the 1958 regulation was signed, railroads like New York Central Railroad posted notices announcing plans to discontinue service. In thirty days, west shore commuters had to find other ways to get to New York. "Mass transit use declined precipitously from 17.2 billion passengers in 1950 to 11.5 billion in 1955 to 9.3 billion in 1960, and the industry faced collapse" (DiIulio, 1994:240). Although Hughes thought that increased competition in the mass transit industry did not result as a product of deregulation thus the restructuring incentive was not a success, Roderick Kaps believed otherwise (Kaps, 1997:106-119). Although Kaps concedes that U.S. passenger rail travel has decreased significantly, Kaps' analysis of the United States transportation industry illustrated the following figures for this industry:

> "Overall, deregulation has strengthened the US industry. Despite price erosion, freight revenue has increased by 19 percent since 1980, and the industry's return on investment, including infrastructure, rose from 4.2 percent in 1980 to 7 percent in 1995 (although this was still not enough to cover its cost of capital of 11.7 percent). Most important, rail managed to keep its

market share at 38 percent—more than double the share of European railroads (Kaps, 1997:106-119)."

Although the success or failure of rail industry may be in question, a failed mass transit industry is not as devastating as a failed banking or energy industry. However, as President Kennedy stated, urban growth needs a proper balance of private vehicles and modern mass transport (DiIulio, 1994:240); in turn, this key resource, urban transportation, required government intervention to ensure its survival; legislation implemented re-regulation. By the 1960s, the Department of Transportation moved the Urban Transportation Administration into the hands of the Department of Housing and Urban Development. However, in the 1980 era of deregulation, President Reagan proposed an end to transit operating subsidies and implemented many deregulation initiatives in the mass transit industry once again. The reality was that public transit support was expensive, productivity was decreasing, and forecasted transit achievements had not been realized. Transit had not controlled pollution, rejuvenated downtowns, nor increased safety. Under political control, transit management was ineffective and inefficient. Yet, in the 1990s, new regulation, not deregulation as started by the Reagan Administration, was implemented to present guidelines to manage the transit agencies more effectively. The Intermodal Surface Transportation Efficiency Act was a 300-page document micromanaging the mass transit authority. The law contained exact requirements, to be enacted in addition to previous legislations, which allowed labor unions to retain power, required public hearings for all fare changes, required extensive data collection, mandated "buy America" provisions, and prohibited supplemental

revenues through charter services. In addition to these federal regulations, mass transit agencies still must suffer through state and local regulations. These regulations impinge effective management through such mandates like significant paperwork for small projects (DiIulio, 1994:244). Demonstrating the ineffectiveness of regulation, Volker and Winter remarked on public servants, commenting, "Not even the most public-spirited government workers can succeed if they are hemmed on all sides by rules, regulations, and procedures that make it virtually impossible to perform well. The most talented, dedicated, well-compensated, well-trained, and well-led civil servants cannot serve the public well if they are subject to perverse personnel practices that punish innovation, promote mediocrity, and proscribe flexibility" (DiIulio, 1994:xv).

The cyclical re-regulation and deregulation of the mass transit industry history illustrates the beginning picture of the utility industry regulation legislation. In the beginning stages of the deregulating the utility industry, there are already parallels that can be seen between these two industries. States that have implemented electric utility deregulation such as California soon began instituting regulations to mandate the procedures utility companies should follow to purchase power and to calculate utility prices for consumers. The Federal Energy Regulatory Commission (FERC) also promised to institute price controls on large utility companies (SITREP, Dec 5 2001). These utility re-regulations limit the firm's ability to control costs and generate revenue, thus questioning the success of deregulation as the success of mass transit's deregulation re-regulations have been questioned.

Airline Industry

"Sixty-two years ago, the U.S. airline industry, by most definitions, was a classic public utility. The services provided by airlines were considered essential, and the necessary capital investment was high in relation to revenues (Costello, 2000)." Like the utility industry, airlines appeared to be a natural oligopoly if not a natural monopoly, because of this belief, Costello states, regulation was thought to protect the public interest (Costello, 2000).

The mass transit situation illustrated the need for initial federal involvement and an example of how this involvement became a bureaucratic nightmare. Airline deregulation illustrates how forecasted benefits of deregulation can be misstated and inaccurate. American persons over 30 years of age are aware that there has been an increasing availability to travel to more markets and at lower costs. From that perspective, the airline industry has proven to be an exc ellent example of deregulation. Yet, the purpose of deregulating the airline industry was to promote complete economic freedom in hopes of achieving a strongly competitive environment; deregulation efforts sought to achieve lower fares through increased competition (Williams, 1993:9). The result of deregulation was a much more efficient industry charging lower rates to consumers; on average, fares are 15 percent lower than they could have been if deregulation had not been implemented (Williams, 1993:59). Government intervention may still be needed. The successful result of efficiency and lower price may be temporary. Forecasters promoting deregulation theorized that the airline industry could produce a sustainable competitive environment through the theory of contestable markets

(Costello, 2000). This theory suggested that market competition existed within the actual market and also with the potential level of firms 'waiting in the wings'. The theory believed that if there was a perfect competitive environment, one in which firms could enter and exit freely, then firms would be forced to price competitively despite the degree of market concentration. Supporting the use of this theory, economists concluded that the airline markets were not natural monopolies. Hence, entry barriers would be low. After thirteen years of deregulation, it became obvious that entry barriers were actually quite high. A few major airlines were able to prevent new start-ups from gaining market share until the smaller companies became bankrupt or gave up; finally, the number of airline companies has decreased to a strong few (Williams, 1993:59). "As this phase draws to a conclusion there is a strong possibility that the surviving mega carriers will increasingly acknowledge the futility of further competitive rivalry, with the result that the choice that consumers will be presented with will be extremely limited. That one still may have a choice to make is not at issue, what is in question is how significant this may actually be" (Williams, 1993:145).

Just as forecasters projected for the airline industry, Stern states that utility competition will make the utility industry more efficient while at the same time giving customers more choices, more options, and lower prices (Stern, 1998: 32). Yet, when Commonwealth Edison Co. deregulated and prices soared more than 100 times the regular price for eight hours, there was an immediate push for re-regulation of electricity prices to place caps on prices during supply-demand imbalance. Furthermore, retail consumers had no choice in their local utility provider. De Ann Weimer agrees with

Stern stating that volatile prices are expected in markets just opening to competition (Weimer, 1998:33). However, this did not happen in the telephone industry. After AT&T was deregulated, long distance prices decreased, but local service is relatively more expensive than what would have been had deregulation not been enacted. "There are pundits in the US who suggest the optimum size of a distribution company is in the millions of customers, not the tens of thousands, to operate in the most efficient manner…deregulation will not bring enough opportunities to offer new services" (McClearn, 2001:53). There are utility companies that may suffer the same crisis of the bank failures; the blackouts and energy rate hikes in California may not be unique events relevant only to the state but may be pre-warnings of the unforeseen impacts of deregulating an industry despite prior analysis and forecasting. Additionally, utility consumers may discover that the utility industry becomes re-regulated as both the financial industry mass transit industry became. Moreover, the utility industry, like the airline industry, may present the consumer with limited choices.

Utility Industry: Players and Deregulation

Mike Santoro, P.E., from AFCESA's Utility Team has been studying the utility environment with mixed reviews (Santoro, Sept 2001). He stated that previous gas deregulation helped the Air Force save $6 to $8 million in costs each year since 1986 from well and transport delivery. However, new legislation permitting electricity deregulation appears to have mixed results in its ability to bring the price of electricity down through competition.

Electric deregulation permits states to deregulate the generation portion of their electric utilities. Across the nation, several states have chosen to implement deregulation in various methods, and some have chosen to remain regulated for a period of time. At this time, Santoro points out that the New England states is the only region that is having success with deregulation; even still, the rates have only lowered as a result of deregulation by 1 to 2% (Santoro, Sept 2001). Although California signed legislated deregulation in 1996 and implemented its procedures in 1998, lowered utility rates may not be realized until the year 2004. When that happens and California finally irons out problems discovered during deregulation, then the rest of the regulated states may feel more comfortable implementing deregulation (Santoro, Sept 2001). "As California goes, so goes the rest of the country." (Klein, 2001:18) Yet, the results from Texas will scare a lot of state legislators. Texas is an isolated state with its own grid. "Texas is an island, so competition should have worked." (Santoro, Sept 2001). Texas has a balanced system with excess generation – supply is greater than demand. Deregulation in Texas had state backing. Rates should have decreased, but they did not, making AFCESA fear that supply and demand does not drive the competitive market (Santoro, Sept 2001).

So what drives the competitive market? Michael E. Porter states that there are five forces of competition: rivalry among existing firms, threat of new entrants, threat of substitute products or services, bargaining power of suppliers, and bargaining power of buyers (Porter, 1980:4). Porter's five forces model of competition goes beyond a supply and demand analysis. It analyzes how companies compete with each other, how strong the buyers or suppliers are in the industry, and how significant is the threat of competition

from new competitive or substitute industries or products by evaluating areas such as government regulation and switching costs.

Threat of New Entrants

With or without deregulation, the threat of new entrants into the utility industry is low. In 1998, when California implemented deregulation on its generation of electric utilities, it required its electric utility companies to sell off all of their fossil fuel power plants (Bohan, Sept 2001). However, each utility company still held control of their individual power distribution network. In turn, if a new utility provider or a competitor decided to enter the market, the firm would have to negotiate a rate to have access to that distribution channel or incur a cost disadvantage by creating a new network. In California creating a new power distribution network alongside an existing one would create an environmental stir. For most consumers, if the price and the availability of the utility were the same, the product differentiation and the switching costs would be low. However, new entrants in the utility industry must deal with the large capital investment requirements and the economies of scale necessary to recoup costs. Furthermore, state regulatory bodies must approve new entrants; this process takes time and money.

Bargaining Power of Suppliers

In a regulated state, the utility company often owns the power plant supplying the utility grid. In turn, the bargaining power is not applicable, because in a regulated environment, the industry is normally vertically integrated in most areas. However, in states such as California, the generation stipulation created suppliers that had contract with the state. The utility companies were required by state law to purchase power

through California's power exchange at rates higher than what they were allowed to charge their customers (Bohan, Sept 2001). The suppliers created long-term contracts with the state for too much power supplied at fixed high prices (SITREP, Aug 2001). Both supply and prices are high in Texas as well; yet, Texas does not view itself as being in the same situation as California (SITREP, Aug 15 2001). Texas is in the beginning stages of deregulation and plans on changing its market design and has more plants on the way (SITREP, Aug 15 2001).

Bargaining Power of Buyers

Just as the bargaining power of suppliers is high in the utility industry, the buyers also have a great deal of control. Yet, most of this control comes from their voting power to persuade the state and federal legislative bodies to control rates and approve and disapprove policies. The ability to make business decisions based on electricity service varies according to buyer group. For example, when the University of Cincinnati evaluates Ohio's future possibilities of deregulation, they considered the limited size of their institution, larger than a standard retail customer yet smaller than an automobile plant or a military installation.

> "From an institutional standpoint, either we have to get big enough that I can just sever from the grid, or I've got to be somewhere in between, and be able – through the deregulated world – to pick up power when we need it…They (the utility companies) have transmission lines, and if we're going to have an interconnection, we need transportation capability. We're not going to build transportation lines." (Wolverton, July 2001:16).

Hence, having a choice in generation when the local service company provides the transmission capability does not give the medium and small consumer much bargaining power other than their legislative power to vote. In other words, in those deregulated states that will actively support distributed power, the large buyers or a cooperative of

buyers co-located will be the only ones with the power of taking themselves off of the utility company's transmission grid. Yet, even these buyers will be dependent on the utility company or some service provider to offer interconnection.

Rivalry Among Competing Firms

In regulated markets, there is no rivalry in that local market among the utility companies. Surprisingly, in deregulated markets, rivalry is low. Rivalry exists between the utility companies and the state governments; debates over power plant approvals, transmission line bottlenecks, set utility rates, and other related matters often cause conflict between the deregulated utility provider and the state government. Perhaps a source of friction among competing firms can be found in the transmission constraints. Transmission bottlenecks can boost power costs. However, these costs would increase for an entire area. For example, "the most costly bottleneck, according to the (FERC) study, was the East-Central transmission link that moves electricity from upstate New York, where there is plenty of power, to New York City, where there isn't. In the summer of 2000, that trouble spot created congestion costs of $724.7 million, partly as a result of the outage at the Indian Point nuclear-power plant on the New York side of the bottleneck" (Smith, Dec 20 2001: A2). In so many words, rivalry for the congested power may have been a problem at that time, but the state controlled the transmission lines and power flows. Consequently, rivalry is low, as stated previously; there are more reports of collusion among the industry's suppliers and buyers than there are reports of contention among the main players.

Threat of Substitute Products

For the most part, when evaluating an industries substitute products, a research investigates substitute consumables the consumer would choose instead of the product in the industry under investigation. In this particular instance, this thesis has concentrated on the deregulated utility industry. In turn, substitute products could be viewed as an alternative source of energy, or they could be deemed as an alternative source of business, the regulated industry. This section believes the threat of substitute products on the deregulation initiative is far greater from the regulated market than from any alternative source of energy. Reports from all over the country and from multiple sources are painting pictures of the failures and the problems in deregulated states:

> "FERC found that summer bottlenecks were worst in those states that had deregulated their retail markets" (Smith, Dec 20, 2001:A2).
> "California may be facing a persistent, escalating glut of electricity as a result of buying too much power through long-term contracts, according to a Los Angeles Times analysis" (SITREP, Aug 15 2001).
> "New England ISO says that customers are overpaying for electricity by $200 million to $600 million annually because of bottlenecks in the long-haul transmission grid" (SITREP, Aug 15 2001).
> "Montana is now feeling the full impact of the (deregulation) plan the legislature passed several years ago, with customers facing an increase in the neighborhood of 30 to 40%, depending on their class of service" (SITREP, Nov 13 2001).
> "In a move that surprised almost everyone, the Federal Energy Regulatory Commission announced on 20 Nov that it will impose strict new price controls on some large power companies whose size permits them to control electricity prices in their home markets" (SITREP, Dec 5 2001).

This last bullet creates an environment of regulation in the deregulated utility industry – similar to the banking and financial industry described earlier. However, in this particular case, the controls and the costs are such that the players may find themselves more comfortable with the original regulated environment than the new deregulated world. If this is the case, then the threat of the regulated utility company becoming a substitute over a deregulated utility company may be high. "The staff of the Arkansas

Public Service Commission announced their belief that electric deregulation in that state should be scrapped or at least delayed until October 2004, because competition would lead to higher prices. A study for the commission staff by Washington, D.C.-based consultants La Carpa Associates said undeveloped wholesale electric markets would cause higher, potentially volatile electric rates if retail market were deregulated" (SITREP, Sep 14 2001). Other states such as Florida are also delaying deregulation initiatives.

Summary

This chapter explored the concepts of energy and deregulation. The history of energy consumption and energy supply was described. Then, the need for a conservation of the finite fuels used was discussed. After this discussion, a description of the regulatory guidance enacted to implement Congressional energy conservation goals was detailed including an illustration of Energy Savings Performance Contracts (ESPC). Once ESPCs were described, literature concerning deregulation was reviewed. This review included examples from the banking, insurance, public service, mass transit, and airline industry in an effort to reveal the complex nature of deregulation and the advantages and disadvantages of removing government intervention.

III. Methodology

Introduction

Chapter one stated that there are unknown effects on Energy Savings Performance Contracts (ESPC) and that deregulation may be one of those factors and may affect guaranteed savings. In chapter two, the concepts of energy, energy regulations and savings measures, ESPCs, and deregulation were described in a review of academic literature. In this chapter, the case study is designed, described, and a report of the steps to conducting case study research is explained.

Research Design

This research tests the influence of deregulation on ESPCs using a case study research strategy. This section compares the case study approach to different research strategies to illustrate the benefits of the case study methodology to this research effort. Then, the type of case study used is described and evaluated for its strengths and weaknesses and how its techniques combat the threats to validity and reliability. Finally, the steps to conducting case study research are listed with essential details regarding the population, sampling frame, data, data collection, and data analysis.

Case Study Methodology

Donald T. Campbell calls man a very competent knower. He explains that common sense knowing is not replaced by quantitative knowing; instead, quantitative knowing builds on qualitative perception. He explains that, as methodologists, researchers must employ a strategy which integrates both (Campbell, 1975: 191). Expounding on this hypothesis, Kathleen Eisenhardt explains that case studies are

research strategies which can use quantitative or qualitative data or a combination of the two (Eisenhardt, 1989: 534). Case studies are comprehensive strategies that can provide description, test theory, or generate theory (Eisenhardt, 1989: 535).

In an evaluation of such new phenomenon such as deregulation and ESPCs, an applied epistemology, which integrates both qualitative and quantitative knowledge, may provide a deeper insight into the interaction between deregulation and ESPCs. Case study methodology is an effective research strategy for combining the two types of knowledge in a manner which employs techniques such as pattern matching and context dependence (Campbell, 1975:184). A case study is an empirical inquiry which studies contemporary events in their real life context (Yin, 1994:13). However, there are six research strategies which should be evaluated when developing a research design: experiment, survey, archival analysis, document review, history, and case study (Yin, 1994:6). Case studies should be treated as a separate research strategy and not compared to strategies using quasi-experiments, correlational studies, or panel designs.

Yet, before further exploration into the aspects of case study strategy is explored, the appropriateness of a case study methodology must be explained. Thomas Bouchard recommends that each researcher choose a method that is most likely to serve his/her purpose rather than one that is most convenient or understood (Bouchard, 363). He also recommends that more than one method be used whenever possible; this creates a greater validity for the final analysis and conclusions. The unique strength of a case study is its ability to deal with a variety of methods and data (Yin, 1994:8). Various research strategies are not mutually exclusive. In turn, case studies may use surveys, statistical

regression, historical studies, and interviews. Just as a literature review promotes more insightful questions about a topic, case studies promote a more insightful look into operational links that may need to be traced over time. Case studies are the preferred strategy when investigating "how" or "why" questions, the focus is on contemporary phenomenon in a real-life context, and the researcher has little control over events (Yin, 1994:1). An experiment focuses on a few variables in a laboratory setting. A history concentrates on past phenomenon. A survey deals with phenomenon also, but its ability to investigate is limited. An archival analysis cannot answer "how" or "why" questions. A one-shot, post test-only design is not a case study; it is a quasi-experimental design. This design is often confused with case study research, but the case study methodology has its own research designs because of the nature of its strategies (Yin, 1994:19). Only a case study can deal with many variables, multiple sources, and triangulation to guide data collection and analysis (Yin, 1994: 13).

There are five components to a case study: questions, propositions, unit of analysis, logic-linking data to propositions, and criteria for interpreting the findings (Yin, 1994: 26). Each individual case in a study is considered equal to an individual experiment (Yin, 1994: 46). In turn, multiple case studies help promote replication logic which is different than sampling logic. Replication logic reduces the threat of external validity (Yin, 1994: 33).

Case studies are more explanatory and deal with links that cannot be discovered by mere frequency. Research questions, which are concerned with prevalence, may be conducted in surveys or analysis of archival records. Research questions, which ask

"hows" and "whys", favor the use of experiments, histories, or case studies. An experiment separates the phenomenon from the context so that a few variables may be studied. Investigators need control over behavioral events. Histories are not able to research new phenomenon. Both ESPCs and deregulation are contemporary phenomenon difficult to reproduce in a laboratory setting. The goal of this research effort is to perform an analytical generalization, not a statistical generalization, of the relationship between these phenomenon (Yin, 1994:9). In turn, case study methodology serves as the most effective strategy for conducting this research.

Campbell recommends "triangulation" and "pattern matching" which can be used as part of the case study strategy (Campbell, 1975: 182-184). Triangulation seeks to achieve realism or reduce construct validity threats in a study by employing multiple methods focused on examining the same construct from independent points of observation. In pattern matching, several pieces of information from the same case are evaluated to determine whether the data matches one potential pattern better than another (Yin, 1994: 25).

Case Study Design

Eisenhardt recommends cross-case comparisons to achieve stronger construct and external validity (Eisenhardt, 1989:545). Dyer and Wilkins disagree; they recommend within-case comparisons to achieve a deeper understanding of the constructs studied (Dyer and Wilkins, 1991:614). Yin proposes that there are four types of case studies that can be used, each with its own strengths and weaknesses (Yin, 1994:39). There are single case designs with a single unit of analysis, single case designs with multiple units

of analysis, multiple case designs with a single unit of analysis, and multiple case designs with multiple units of analysis. This research effort uses a case study design labeled Type IV, a multiple case design with multiple units of analysis. This design uses within-case comparisons as recommended by Dyer and Wilkins and cross-case comparisons as recommended by Eisenhardt by conducting each single case in a manner similar to conducting a single experiment. The final analysis is then similar to a cross-experiment design and logic (Yin, 1994:46). Each case is studied independently, and then each "experiment" is compared to the other "experiments" to evaluate replication in findings.

Threats

Dooley states that the quality of a research effort is judged on two dimensions: reliability and validity (Dooley, 2001:77). Yin proposes tactics that may be used in various case study designs to minimize the threats of construct validity, internal validity, external validity, and reliability (Yin, 1994:33). This research effort will employ several of these tactics; the applicable ones are described in this section. In the data collection phase, multiple sources of evidence will be used to combat the threats of external validity. This threat will also be minimized in the same phase by using a chain of evidence, or a case study database which details the data source, data, and the data collection techniques. Additionally, external validity will be minimized in the research design phase by adopting a multiple case study approach, an approach which uses replication, not sampling, logic giving each case the weight of a single research effort (Yin, 1994:46). A multiple case study reduces the threat of external validity by seeking a replication of results across cases. In the data collection phase, the threat to internal

validity will be minimized using a pattern matching analysis technique, a technique described later in this chapter. The dimension of reliability will be strengthened through a development of a case study protocol, the case study database, and the strict adherence to the guidelines in the protocol. These tactics will be illustrated in the depiction of the case study steps that were followed.

Case Study Procedure

There are nine steps to a multiple case study strategy (Yin, 1994:49). First, as with many strategies, the researcher develops a theory. The second step, the most critical to the dimension of reliability, is designing the case study protocol. Next, cases are selected. Then, the case studies are conducted. Each case study is conducted separately, and, in the fifth step, individual case reports are written. Within-case comparisons are made at that time. It is not until the sixth step that cross-case comparisons are made and conclusions are drawn. In step seven, theory may be modified as necessary. Then, step eight, policy implications are developed so that a final case report, step nine, may be written. Using these steps, this research design was developed.

Data Collection

The case study protocol is a step-by-step guide used for describing how data will be collected and how this data will be analyzed. Adherence to this protocol gives the researcher consistency in evaluating each case. This protocol is described in these next two sections: Data Collection and Data Analysis.

The population studied is the Air Force Energy Savings Performance Contract (ESPC). Using the Type IV, multiple case multiple units of analysis approach, each

individual Air Force base reflects one case, and each task Order (TO) emulates a subunit of analysis. Subunits of analysis also include observation of TO execution activities and contract activities; open, informal interviews with personnel associated with each TO; document review of the contract statement of work, contract clauses, and financial payback sections; and meetings and conferences to gather information and relevant data for evaluating each ESPC. The data consists of a collection of meeting notes, interview transcripts, Regional ESPCs, the five installations, the corresponding TOs studied, and other documents and archival data collected from a theoretical, not random sampling. The five installations studied were selected from a sampling frame, or list of all AF installations engaging in or considering ESPC TOs, provided from the Air Force Civil Engineering Support Agency (AFCESA). These installations, or cases, were selected using theoretical sampling, described by Eisenhardt, to allow the research to focus efforts on theoretically useful cases (Eisenhardt, 1989:533). Secondary data collection, in the form of personal observation, came from ESPC regional conference and meeting notes, and ESPC decision memorandums. To perform the theoretical sampling, cases will be selected to provide a diverse selection of bases. Bases (in urban or rural areas, in highly populated areas or sparsely populated areas, in locations affected by deregulation, and in different regions of the country and employing different types of TOs) were chosen. These five bases provide a representative sampling of populations, utility issues, energy conservation measures, and contract actions. However, it is the TOs at these bases that provide the primary focus of the data analysis.

Case Bases

	Region	# of TOs	# of TOs Construction Complete	Climate	Population Type	Deregulated?
Base A	3	1	0	Cold	Rural	No
Base B	4	1	0	Seasonal	Urban	Yes
Base C	5	2	2	Seasonal/Warm	Suburban	Yes
Base D	1	2	1	Warm/Humid	Rural	No
Base E	6	3	2	Warm	Urban	Yes

Table 1. Case Base Sampling Frame

The data collection at each installation was adapted according to each base's situation. At one installation, there were two utility providers servicing electricity for the base. At another installation, the terrorist bombing on United States soil ended the case study visit, and the remaining information collection was performed via e-mail, telephone, or on-line. The manner in which information was conducted at each installation is listed below.

At each installation, contract files were reviewed, and contracting personnel were asked document clarification questions as necessary. In addition, contracting personnel were asked if they wished to provide any written, oral, or e-mail information regarding their energy savings contracts. Government engineers were also asked document clarification questions when necessary. In addition, these engineers were asked to provide information on whether their installation experienced any load changes or any

utility rate changes. Also, they were asked if they wished to provide any further written, oral, or e-mail communication regarding the ESPCs.

Base A

A case analysis was conducted at Base A from 20-24 August 2001. Moreover, during the Base A case analysis, the utility company was contacted. An analysis of the Demand Side Management Agreement (DSMA) that Base A awarded to the utility provider was also given a document review, and a document clarification interview of the utility company as a contractor was conducted due to the fact that the DSMA appeared related to the ESPC. An open interview of the contractor as a utility provider followed immediately. Finally, this case study includes an interview with both a Public Utility Service Commissioner and the assistant which was followed up later with a utility rate analysis e-mailed to the researcher. Base A's ESCO was contacted by phone, but only to receive schedule information which was missing from the files and unknown by the government personnel (an issue to be discussed later) – not for interview or document analysis.

Base B

A case analysis was conducted at Base B from 10-11 September 2001. Moreover, during the Base B case analysis, the September 11th terrorist bombing occurred in New York City and Washington D.C., and base employees returned to their homes. In turn, any document clarification questions were performed via phone or e-mail.

Base C

A case analysis was conducted at Base C from 17-21 September 2001. Moreover, during the Base C case analysis, the two local utility companies were contacted.

Base D

A case analysis was conducted at Base D from 24-28 September 2001. Moreover, during the Base D case analysis, the utility company was contacted. Finally, this case study includes interviews with contacts from the Air Force Civil Engineering Support Agency (AFCESA) which was located within a 100-mile radius of the installation.

AFCESA

After visiting with Base D and the local utility provider, the case analysis portion was complete for that installation and the remainder of the week was spent speaking with the AFCESA representatives. During that time, clarification questions which could not be answered at other installations were answered. Also, it was discovered that the state in which Region 6 was located was negotiating a utility provider agreement that would be determined in November. This agency became the primary source for the remainder of any utility questions and all ESPC clarification issues.

Base E

A case analysis was conducted at Base E from 1-4 October 2001.

Data Analysis

Pattern matching is the primary method to be used in this research effort for analyzing each type of data. Pattern matching is the process of linking data to some theoretical proposition (Campbell, 1975:182). Once data collection is completed and

entered into the research database, individual case analysis is conducted. Within-case analysis is conducted to gain familiarity with data and perform preliminary hypothesis testing (Eisenhardt, 1989:533). As individual case reports are written, the first stage of pattern matching begins. First, the research relies on the theoretical proposition – deregulation is a factor influencing the guaranteed savings of ESPCs. Second, in order to perform pattern matching, the research divides this theory into effect and no-effect propositions, similar to null hypothesis testing – deregulation influences guaranteed savings, deregulation does not influence guaranteed savings. With these two propositions stated, when data is collected, it may be evaluated and placed under the effect or no-effect proposition to support or refute the original theory.

The criteria for interpreting each case for theory evaluation has five main divisions: state deregulation status, utility rate stability, guaranteed savings analysis, contract management, and contractor performance. For purposes of analysis and evaluation the constructs will be defined and measured as such:

Construct	**Definition**	**Scale**
Deregulation	*Electric Utility Status in State*	Yes/No
Utility Prices	*No fluctuations in price*	Stable
	Price spike or prices increasing	Fluctuating
	Prices increasing/decreasing	Volatile
Savings	*On metered buildings*	Metered
	On non-metered facilities	Stipulated by Contractor
Contract Management	*Contract documentation and correspondence*	Documentation
	Lack of contractor documentation and correspondence	No Documentation
Contractor Performance	*Perceived performance problems*	Government Complaints/
	No perception of performance problems	No Government Complaints Noted

Table 2. Definition of Constructs

Gas deregulation is not a measurement of this thesis; gas deregulation has affected most states since 1986 (Santoro, Sept 2001). Each case evaluation defines its deregulation status by the electric utility legislation in the state. If competitive generation legislation has been implemented, then deregulation is labeled "yes". Otherwise, this construct is labeled "no". Utility prices and their trends are varying across country. Installation localities that have had a constant average price during the past twelve months have "stable" utility prices. Installation states, that have seen seasonal price spikes or a steady increase or decrease within the past twelve months suggesting a trend, have "fluctuating" utility prices. Installations located in areas that experienced unexpected increases or decreases in prices during the past twelve months are considered to have "volatile" utility prices.

The construct of savings is the core of this thesis effort. Installations are guaranteed to receive a repayment of expenditures (contractor payment) through the energy savings reflected in reduced utility bills. Each case is evaluated on the method used to measure and evaluate these savings. If energy savings measures are performed on facilities that have individual metering, then the construct of savings is labeled "metered". If energy savings measures are implemented in facilities without individual meters, then savings are labeled as "stipulated by contractor". In those instances, the facilities share meters with other buildings on the installation. In turn, the contractor *stipulates* that the energy savings measure will give the government savings, and thus, the government begins making contractor payments once the energy savings measure has been constructed and accepted. There are no individual meters on those facilities to

measure or evaluate whether the energy savings measure is solely responsible for lowering the installation's utility bills. In ESPCs, all savings are guaranteed by the ESCO. In this construct, "metered" savings are those guaranteed savings that the government can verify on individually metered facilities. "Stipulated" savings represent guaranteed savings that the government cannot easily assess. These savings are reflected in the installation's overall utility bill and may be influenced by other factors. In turn, the base civil engineers review the contractor's justification of the quarterly and annual savings. In both, stipulated and metered environments, contractor quarterly and annual reconciliations must be performed; however, the justification of savings becomes critical in the stipulated environment without the availability of individual meters to measure each project's savings, or losses.

Contract management at each installation involves the relationship between the contracting office, the government civil engineers, and the ESCO. When evaluating the government team, the construct of contract management is defined as the understanding of ESPCs, the handling of documents and correspondence, the management of the contractor, and whether training was required. If basic file work was inadequate or the team had difficulty documenting contractor difficulties, then the construct of contract management was labeled "No Documentation". Otherwise, this construct was labeled "Documentation".

Contractor Performance involves perceptions of the government employees at the case installations studies. Because of the subjective nature of performance, contractor performance is defined simply as perceived performance problems. Government

engineers complained that several performance problems went beyond that of normal performance issues. Additionally, several quality problems were greater than that found in other contracts. Some of these engineers perceived problems with contractor performance. Due to the vague nature of this construct, the scale label consists simply of perceived complaints or the lack of these complaints, "Government Complaints/No Government Complaints Noted".

Once within-case pattern matching was performed, cross-case pattern matching was conducted. A cross-case pattern search forces the investigator to look beyond the initial impression and see evidence through multiple lenses (Eisenhardt, 1989:533). At this juncture, replication logic is critical to drawing cross-case conclusions, step six. There was no disparity between cases; in turn, there was no need to modify theory and perform a new multiple case study. Consistency was found and conclusions can be supported, thus implications are discussed along with recommendations. Particularly, deregulations impact on the payback time of ESPCs along with the other constructs is evaluated, and the pattern-matching table illustrates what patterns may be reflected across cases. This thesis is limited in determining which characteristic will be more probable than another. However, the pattern-matching illustrates whether deregulation is a common influence and whether it is the only unique influence on TOs that do not comply with original payback time guarantees.

Summary

This chapter discussed the case study technique used for performing this research effort. First, the case study methodology was described and a comparison was made

between case study and other research strategies. This comparison served as the basis for supporting case study use for this research. Next, the specific type of case study design was detailed and evaluated for its effectiveness. In turn, the study explained how it proposed to use various techniques to minimize the threats to validity and reliability. Then, the steps to conducting a multiple case study design were presented. Finally, data collection and data analysis, the elements to case study protocol, were defined for this study.

IV. Findings and Analysis

Introduction

This chapter will provide an individual case analysis of each base studied. Each analysis was conducted through on-site visits with government personnel. The names of each base have been deleted to protect anonymity of the personnel and the information provided. Each individual analysis will be summarized and compared for a cross-case comparison discussion of the findings and recommendations. Overall, each base analyzed managed at least one TO. Table 3 provides a representation of the base TOs reviewed.

Base	#TOs	Dollar Value	Financed Value	Description
Base A	1	$4,300,673	$8,806,329	Base-wide facility upgrades (lighting, plumbing, etc.)
	DSM	$1,853,207	$4,019,027	Propane Mixing Plant
Base B	1	$4,199,813	$11,904,830	High Temperature Hot Water System & Chiller Plants
Base C	2	$2,472,694	$1,306,451	HVAC, lighting, water conservation, lighting retrofits, compressed air, etc
		$293,599	$427,231	Exterior lighting and water conservation
Base D	1	$134,197	$241,942	Lighting, ventilation control, motors, etc.
Base E	2	$1,674,150	$2,873,529	Thermal Storage & Variable Volume Chilled Water Pumping Systems
		$446,474	$836,730	Military Family Housing Radio Frequency Controllers

Table 3. Base Task Order (TO) Description

Base A

Base A is located in Region 3. Base A has one ESPC TO and one DSMA TO. Base A began two energy savings projects with two separate contractors at the same time. Although DSMAs are not the topic of interest, reviewing Base A's DSMA was significant in discovering the possibility that this installation may have been paying for two conservation efforts that may be creating an overlap of savings. The propane mixing plant project in the DSMA reduces energy expenditures on Base A; this same area has an ESPC which guarantees energy reductions. Consequently, by implementing two energy savings measures with two separate contractors, there may be a possibility of overlap.

Deregulation

Electricity has not been deregulated. A committee has met to discuss deregulating the electricity industry and is scheduled to appear before the state legislative body in 2003. Deregulation may occur as soon as 2004. However, cooperatives are common. In rural areas where the population is even scarcer than the small towns, farmers obtain and maintain their own source of energy with financial assistance from the federal government.

Utility Prices

The utility provider and the civil engineers both report that although last winter experienced increased gas utility prices, electric prices are stable in the state. Overall, the public utility commission agrees that the electric utility prices are low and constant. The Public Utility Commissioner Assistant explained that there is a fuel clause adjustment which causes monthly rate changes, but these changes have remained level.

Savings

ESCO performs the measurement, verification, and reporting. To someone outside of the ESPC climate, this appears to be a conflict of interest; it is as if the person performing the work is also the person who writes the performance appraisal on the work performed. Measurement and Verification have not been placed on strictly metered areas, and savings have been designated as stipulated. Because of this stipulation in savings, issues such as possible overlaps in energy conservation contracts are not easily resolved. For example, the DSMA contract does not reduce energy consumption; it allows Base A to change its utility rates from firm to interruptible utility rates. During the interruptible time periods, the base switches to the propane mixing plant. This saves Base A dollars off of the utility bill. The ESPC savings measure guarantees that its project will reduce energy consumption and save utility bill dollars. However, in a stipulated savings environment, specific figures regarding savings are unknown.

Contract Management

Base A's ESPC TO 1 is for base-wide facilities upgrades in the amount of $4,300,673.00 at an interest rate of 8.75 percent. The contractor proposed eight individual Energy Conservation Projects (ECPs); seven will be implemented. The propane mixing plant project proposed by the ESCO was transferred to the DSMA. The eight ECPs proposed by the ESCO include: (1) Energy Efficient Lighting; (2) Heat Exchanger Controls; (3) New Plumbing Fixtures; (4) Propane Mixing Plant; (5) High Efficient Laundry; (6) VFDs on Hospital Fans; (7) Pride Building Retrofit; and (8)

Insulate Above Ground HTHW Piping. The expected annual cost savings for this TO is approximately $617,988 and $8,784,439 for the entire payback period. The monthly payment for the period is $51,499 for 171 months or $8,806,329 for the entire payback period. The simple payback period is 6.5 years, but with the interest included, the payback period becomes 14.25 years.

Base A received the Phase I report on 16 July 1999. The RCO issued the ESCO a notice to proceed with Phase II on 10 September 1999. Due to unknown circumstances, the installation Contracting Officer also issued a notice to proceed with Phase II to the ESCO but on 9 November 1999. Initial correspondence did not appear to include the installation contracting office. There are some areas of significance. For example, Base A contracting personnel appear to lack the necessary training important to administer the task order. Utilities privatization is a term used for the ESPC projects at this installation. Payment issues and government savings are often unclear to the personnel. Also, the length of time from Phase I start to construction complete is lengthy. Base A received a Phase I report from the ESCO on 16 July 1999, but as of 14 August 2001, construction for Phase III had not begun. The ESCO was tasked and had agreed to have construction complete by April 2001 but had failed in this arrangement. The question arises as to whether ESPC installation-contracting officers should receive any consideration from the ESCOs for delays as mandated with other government contracts. Furthermore, it is necessary to note that the termination payout schedule begins with a higher dollar amount than the regular payout schedule. Also, in regards to the payment schedule, there is no allowance for an automatic recalculation if utility rates change; the payment schedule

must be modified with a bilateral modification – a possible problem if the government and contractor can not agree on what is fair and reasonable.

Contractor Performance

The amount of total contractor payments, $4,300,673, remained the same in several contract revisions. However, the guaranteed government savings changed in several of the revisions although the government savings should equal or exceed contractor payments and the propane project was removed from the contract. Additionally, ECP 2 (Exterior Lighting Controls) incurred an annual cost of $243,799 but only received an annual guaranteed savings of $20,077; savings should be greater than costs not less. Although costs can be greater than savings for individual projects as long as savings are greater than costs overall, such a difference in one ECP for a simple energy measure created questions the engineers had to investigate when the researcher asked for clarification. Furthermore, the ESCO repeatedly pressured the installation commander to push the project along. Additional attempts to influence contract award included arranging a meeting with base officials in December, 2000 to brief them on ESPCs, the savings that the ESCO proposes, and the future steps to implementation. Finally, when the researcher contacted the ESCO during the on-site case study to receive an updated schedule (as one was not in the file), the ESCO stated that an updated schedule had not been made due to the ESCO's search for qualified subcontractors. The contract award had been made several months prior, and before award, subcontractors are to be selected in advance per AFCESA guidelines (ESPC Intro, 2000). The ESCO had been negligent by not fulfilling this requirement.

Base A Summary

The utility industry is not deregulated in this state. Utility prices have been stable. However, contract management personnel need improvement on ESPC procedures. There are stipulated savings on Base B. Although the government does not truly understand how to manage ESPCs, the contracting personnel do understand there may be perceived performance issues with the contractor. In turn, there have been complaints of contractor performance.

Base A Construct Summary Table

Deregulation	**No**
Utility Prices	**Stable**
Savings	**Stipulated**
Contract Management	**No Documentation**
Contractor Performance	**Government Complaints**

Table 4. Base A Construct Summary Table

Base B

Base B is located in Region 4. The primary focus of the energy measure of the ESPC project at Base B involves chiller plant modifications.

Deregulation

The electric utility is deregulated. In January 2000, the legislation approved the restructuring of competition, but it was open for all residential customers by January 2001 (EIA, 2002). Initially, Base B was a potential case affected by deregulation. Because the main purpose of this particular TO was to save on demand cost based on projections of on-peak and off-peak rates, a government engineer's statement that the

installation's utility provider had recently announced that it would change its billing structure from a variable rate to a flat rate fee became critical. When later clarifying the purpose of this change with AFCESA, they confirmed that utility companies would do this to ease administrative burdens and costs. However, at the end of the case study, it was discovered that the utility company did not switch billing structures.

Utility Prices

Utility prices have been fluctuating in this region as a result of bottlenecks in the distribution system. Initially, deregulation efforts proposed a rate freeze on utility prizes through 2005. However, legislation proposed rates be reduced by 7 percent. In the end, utility prices decreased and increased due to legislative influences, transmission constraints, and distribution concerns.

Savings

Savings are stipulated for Base B's ESPC. Additionally, out of the $3,266,401 in project cost improvements, the ECP, Improve Chiller Plant, for $2,079,171 never will have a guaranteed savings to the government.

This is not a unique situation for ESPCs. The annual guaranteed savings amount is totaled by the ESCO as the capital cost plus the operation and maintenance costs see Figure 5. Before this happens, the ESCO calculates the total capital cost by adding project costs, financing fees, and other project markups. Once this figure is calculated, then the ESCO uses the finance

Total Project Direct Costs
+ Financing Procurement Fee
=Total Direct Costs
+Project Markup
=Total Capital Cost

Figure 5. Project Cost Example

term, an interest rate for the capital cost, and an inflation rate for the operation and maintenance cost. In actuality, the government's payment of $11,904,830 for the $3,266,401 project does not include the $3,389,261 fee of operation and maintenance costs.

Contract Management

Base B has one ESPC TO in the amount of $4,199,813 for 6 energy conservation projects (ECPs). The primary focus of the project is to improve the installations High Temperature Hot Water (HTHW) System and Chiller plants. Out of the six ECPs, three do not create cost savings. However, the overall project still has a savings greater than cost benefit. Additionally, when the engineer was asked why individual projects were chosen that had costs greater than savings, he explained that in order to achieve the final outcome, some improvements had to be made to the chiller plants. The previous contractor responsible for the chiller plants had left the installation under a default situation, and the plants were in need of some repair before they could be modified for conservation efforts. However, the interest rates and overhead charges of ESPCs over a period of 20 years may be a costly method to fix the default contractor's mistakes. Yet, this installation must deal with not only the military personnel that other installations must manage but also a 70 percent civilian turnover rate in the contract management office. Yet, in the long run, one must evaluate this contract that has total project costs of $3,266,401 but a payment to the contractor of $11,904,830.

One way this installation helped manage the contract and overcome the problems with personnel turnover is noteworthy. The base contracting office used Texas A&M University to act as a third party to serve as an advisor to solve difference's of opinion on contract issues before the Task Order was signed. Additionally, although this installation had a grasp of the contract situation, the contracting office lacked pricing memorandums, site visit reports, etc. The contracting officer stated that payments have been delayed six months due to delay in chiller monitoring modifications. The government civil engineers will not accept the contractor's chiller monitoring modifications, because they believe that these adaptations are below quality. As a result, the ESCO cannot begin receiving payments for savings until the government signs full acceptance. The contracting officer stated that this has motivated the ESCO to fix the work correctly. At the time of the case analysis visit, the construction complete date was six months overdue. The contracting officer also stated that this particular ESCO had been taken over by one of the ESCOs from another region. Contractor correspondence reflected the changes in their corporate management.

Contractor Performance

The base civil engineers delayed accepting the final TO for over six months after the scheduled date due to the Heat Plant monitoring device. However, the government engineers felt that this was not necessarily a problem with the contractor but a problem with an understanding of the contract language. In other words, the base civil engineers believed a strict interpretation of the Heating Plant's monitoring was crucial to the

verification of savings. In turn, they believed that the slightest deviation in performance or product would affect the justification of guarantees. Consequently, the construction acceptance had performance problems, but the government engineers understood these problems did not exceed normal performance challenges.

Base B Summary

The electric utility has been deregulated. Utility prices have increased in this region. Contracting personnel understands basic ESPC procedures and appeared effectively able to manage any ESCO issues. The files were not kept as formal contract files, and many formal contract documents were missing. This base collaborated with a third party, Texas A&M University, in negotiating the measurement and verification portion of the contract. Although savings are stipulated, the monitoring and controls on the largest energy control project, the Chiller Plant, has been strongly inspected by the government engineers before the contract will be termed "construction complete".

Base B Construct Summary Table

Deregulation	**Yes**
Utility Prices	**Fluctuating**
Savings	**Stipulated**
Contract Management	**No Documentation**
Contractor Performance	**No Government Complaints Noted**

Table 5. Base B Construct Summary Table

Base C

Base C is located in Region 5 and is particularly large with 5,000 acres and 1,800 buildings. Base 5 has two ESPC TOs and is serviced by two electric utility providers. The first TO is in the amount of $427,231 from 25 November 98 to 10 September 2020 – 22 years. The project is for exterior lighting and water conservation. TO#2 (5001) is a combination of projects including HVAC, lighting, water conservation, Energy Management Control Systems (EMCS), lighting retrofits, and compressed air. TO#2 (5001) totals $2,472,694 and covers 14 years from 15 May 2000 to 14 May 2014.

Deregulation

Electric utility restructuring was enacted by the legislature in September 1996 and in 1998 deregulation was open to all consumers (EIA, 2002). However, after the case study analysis was complete, retail choice was suspended in October 2001; deregulation had been replaced by re-regulation (EIA, 2002).

Utility Prices

Local utility specialists explained that although the area's population has been increasing, the energy consumption has been decreasing. In turn, load growth has been progressively decreasing. Furthermore, utility prices are affected by the state contract utility prices. Because the utility companies had to sell their generation facilities during deregulation efforts and then these same utility companies became non-credit worthy, the utility companies must purchase energy from the State Department of Water Resources (DWR). The DWR purchased energy in 15- and 20-year contracts at high prices. Due to those long-term mortgage agreements, all of the utility providers had to change their rates

when they signed new contracts with installations around the state. Base C signed a contract from 2005 to 2024 agreeing to how much power its wants and when, and Base C pays a percentage according to how much it costs the hydro facility to produce the power.

Previous utility prices were volatile. When the state deregulated the generation of electricity in 1998, the state made the stipulation that utility companies sell off all of their fossil fuel plants. Then, the state imposed rate caps and forced the utility companies to purchase power through the state's power exchange. Yet, the power exchange exceeded the rates that they were allowed to charge their customers. In turn, some providers had to borrow amounts totaling $9 billion to buy power, because they could not afford the discrepancy in prices. These providers then became non-credit worthy. By state laws, once the utility provider became non-credit worthy, it was not allowed to buy power any longer and the state became involved. One utility company declared bankruptcy. Another chose to go to legislation instead and is still having problems getting bonds. Another utility company fared better because of its electric power from hydrodams. Yet, one company is considering a 40 percent increase in utility rates in a 2004 agreement. Electric utility rates should further increase in winter as natural gas prices increase, because many plants are natural gas fired.

Yet, overall, the volatility of rate swings in the market has settled down. These swings were tied mostly to natural gas. Fortunately for Base C, the primary electric utility provider is a hydrodam-based company. This company sells for only cost-base rates by law, and these rates are generally lower than market rates even during off-peak times by law. This utility provider is a different type of company than the other electric

utilities. Most of its power is obligated to sell to only wholesale power although the state considers Base C a retail entity, and its power has to use another company's transmission lines to get to Base C. However, that other company charges the provider a monthly capacity rate. If market pricing does come into effect, it will not affect this company and hence not Base C. This company has an agreed upon rate for its transmission line usage good until 2004; afterwards, however, Base C only gets a percentage of this company's allotments.

Savings

Although savings are also stipulated at Base C, it is possible that there will not be a savings guarantee met the year the analysis was conducted on the *stipulated* savings. The ESCO guarantees the government savings each year; this satisfies Air Force energy mandates and financing reductions.

On 13 December 1999, the ESCO submitted its annual verification report. It stated that the first year's savings for TO#1 (5000) was $145.51. The government disagreed with the contractor's second annual verification report, submitted on 08 February 2001. The government disputed the report's statements that there was a cumulative energy cost avoidance of $33,690.73 (previous year $145.51), a cost avoidance of $16,845.50 for the year (previous $145.51), and a cumulative savings of $292.73. Because savings are stipulated at this installation, the government must press the contractor to resubmit the report with better figures. The lack of individual meters on each of the government facilities prevents the government engineers from measuring the savings accurately.

The government civil engineers discovered that on TO#1 the baseline rates to calculate savings were agreed and set firm in the contract document. However, these baseline rates were questionable in TO#2. Additionally, the engineers stated that there were quality issues with the EMCS, lighting, and lighting retrofits that would affect the savings the government receives. Furthermore, the government engineers complained of paying a contractor for service without savings even if the contractor stipulated that savings had been received. In the engineer's view, this is a problem with the overall ESPC concept. The contractor makes the improvement, stipulates that savings have been made, and submits annual reports verifying measurements that can hardly be taken without proper metering devices on individual facilities which received improvements.

Contract Management

Each contract file contained documentation of every contracting action. Additionally, records illustrated the installation's use of price negotiation, invoice reconciliation, and other contracting documents to manage the ESPC TOs. Memorandums between the contracting and civil engineering squadrons documented communication efforts regarding contractor actions and contract concerns. All activities regarding the contract were recorded and filed appropriately; moreover, the contracting office and base civil engineers performed the activities required to effectively manage the ESPC TOs. Activities acknowledged included follow-up correspondence when the contractor failed to complete an activity or submit a report. Other activities noted reflected the procedure of contractor contact, i.e. the base civil engineers contacted the contracting office when a problem or an issue arose and the contracting office contacted

the ESCO. Contract files were complete with internal and external correspondence, invoices, acquisition plans, the contract and modifications, and documentation of training qualifications.

Although there were no contract management issues between the government civil engineers and the contracting office, there were a significant amount of memorandums regarding the expenditure of funds and paying the contractor. The interesting notation is that the financial community at this installation may not be comfortable with the financial obligation process of ESPC. Once the contractor began submitting correct invoices, the government paid interest penalties for three months due to its failure to pay the contractor.

Contractor Performance

The first TO began October 1998 and was construction complete by the end of November 1998. In turn, initial performance was not a concern. Soon after, contractor contract administration became a concern when the contractor consistently failed to submit correct invoices. Finally, when the contractor learned the correct method of submitting an invoice for payment, the government failed to submit contractor payment. Eventually, the concerns were resolved until the second annual reconciliation. Yet, these concerns were not issues of contractor performance. Perceptions of contractor performance did not appear until the second annual reconciliation and until quality issues with the EMCS and some of the lighting retrofits were beyond that of contractor negligence. For example, engineers discovered that the lighting retrofit project did not receive a true energy conservation improvement. The ESCO did not compensate for

damaged lighting when performing savings assessments. In other words, the ESCO agreed to conduct an evaluation of the hangars, reduce hangar energy consumption, and reduce hangar lighting levels. However, in the end, the ESCO allowed for lights that had been burnt out or damaged in its initial assessment; this factor affected the end result. Base C engineers claim that the lighting retrofit project is not an improvement to the facility; any savings earned are due to the failure to achieve proper lighting levels. Overall, the engineers view performance for this ESCO to be beyond that of normal quality problems. There was the perceived belief that the contractor was purposely installing faulty product in an attempt to save costs.

Base C Summary

Deregulation is active in this state, and utility prices are volatile. Savings have been stipulated. Although the financial community has concerns, there were no discrepancies found in the contract management team. Furthermore, even though the performance began without problems during the first TO, the government complained of perceived contractor performance issues as the ESPCs progressed.

Base C Construct Summary Table

Deregulation	**Yes**
Utility Prices	**Volatile**
Savings	**Stipulated**
Contract Management	**Documentation**
Contractor Performance	**Government Complaints**

Table 6. Base C Construct Summary Table

Base D

Base D is located in Region 3 in a regulated utility state. Base D has one ESPC TO for lighting, ventilation control, motors, and Energy Management System Enhancement (EMSE) for $241,942.92 and 156 payment months or 13 years. Payments began after construction was accepted in January 2001.

Deregulation

The state conducted a twenty-year study into deregulation, and although there was a proposal due back by December 1, 2001, there will be no deregulation on the retail level (Base D) for at least 10 years. There may be a move to deregulating wholesale customers – customers that own all of their distribution systems but have to purchase power, like a town or a city. Deregulation in that area may be 5 years away. Overall, deregulation is not a threat to the local utility company which is a subsidiary of one of the lowest costs producers in the country.

Utility Prices

The local utility provider is coal fired and is coming under scrutiny of air emissions advocates, yet this energy source is a factor in the state's low and stable electric utility prices. Utility price stability since 1989 may be due to the energy source and to the management of the utility companies. Although the local utility company has had 300,000 more customers, it has kept the same number of employees. A rate increase petition with the Public Utility Commission will be the first rate relief requested since 1989, and it would go for commercial operation investment into retail cost – a $40

million cost starting July 1, 2002. This would increase Base D's base rates by 4.5 percent.

Utility pricing in the state has affected on Base D's ability to contract an ESPC. First, establishing the baseline utility rate for the TO was difficult for the potential contractors wishing to bid on the proposed effort. At the time of the solicitation, the state was experimenting with Real Time Pricing which is similar to market pricing. The utility company began a pilot program of proprietary utility rates in June 1999 till May 2000. The problem with it was that there was no real rate structure. Rates fluctuated by the hour. The installation could call up the utility provider the night before and receive an estimate of the approximate peak prices, but these were just estimates. During this time, rates were determined based on whatever it cost to generate power during that hour, and the state commission had to approve. Since the local utility provider did not wish to reveal the proprietary manner Real Time Pricing was calculated, the utility company provided the contract bidders with only the utility history of the three years prior to the contract bid. Overall, from the time of the case analysis visit back 10 years including the experimental Real Time Pricing, there has been no significant rate change – the rate has fluctuated around 4 cents consistently. In fact, the utility is seeking permission from the state to increase rates. This situation creates a second problem for the final contractor, the ESCO. At first, the ESCO had difficulty obtaining rate information, then the ESCO had difficulty generating savings on an installation with very inexpensive utility prices.

Savings

Although Base D uses individually metered facilities to measure and verify energy reductions, base civil engineers comment that there are still other factors interfering with a true measurement of guaranteed government savings. For example, these civil engineers stated that the main concern is that the maintenance cost is the hidden cost part, and that this cost is not truly considered when thinking about the value of ESPCs. When the engineers were forced to choose a project for their installation they chose only metered buildings so that the government engineers could check the contractor's measurement and verification. The engineers wanted to note that ESPC programs could not work on A-76 bases unless you have a way of negotiating in the maintenance costs or you have the money to burn on duplicate maintenance costs. The rationale behind their thought is that both contracts create two sets of service contractors providing maintenance at a facility, although ESPC does not advertise to be that type of contract vehicle. Yet, the engineers will argue that an ESCO will not sign an ESPC agreement without the operations and maintenance costs due to the money they receive in the contract. They believe this portion may be where the bulk of their profit lies. Their discussion stems from a contention they were currently having with signing Phase II of a second TO. They refused to agree to the task order due to the possibility that a couple of the areas designated on the task order may be outsourced. Additionally, the engineers questioned a number of the costs involved.

Contract Management

Each contract file contained documentation. Additionally, records illustrated the installation's use of price negotiation, invoice reconciliation, and other contracting documents to manage the ESPC TOs. Memorandums between the contracting and civil engineering squadrons documented communication efforts regarding contractor actions and contract concerns. All activities regarding the contract were recorded and filed. There were some activities that were not recorded in the files that had been discovered during clarification discussions. However, overall contract files were complete with internal and external correspondence, invoices, acquisition plans, the contract and modifications, and documentation of training qualifications.

Several memorandums indicated problems with the invoice process, but overall there were no issues with the contract management by the civil engineer and contracting officer team of Base D's ESPC.

Contractor Performance

Although the government civil engineers questioned the ESCO's performance, there were no documents to support any complaints. Furthermore, the complaints stemmed from arguments regarding a possible second TO. For instance, the proposal costs of the TO were questionable in the government's opinion. Costs that had been listed in TO#1 had been doubled in TO#2. The government believed that the ESCO should have had a learning curve and costs should have decreased. If costs increased, these costs should not have increased to such a large proportion. After the government engineers questioned the costs, the ESCO submitted a proposal for $3 Million over the

original proposal and then sent a complaint to the installation's headquarters stating the government was delaying proposal acceptance.

Base D Summary

Deregulation will not be a factor on this ESPC TO for several years. Utility prices have been stable for over ten years. Additionally, ESPC projects are on metered facilities. The contracting office and government engineers understood ESPCs. Lastly, there were contractor complaints of perceived performance issues.

Base D Construct Summary Table

Deregulation	**No**
Utility Prices	**Stable**
Savings	**Metered**
Contract Management	**Documentation**
Contractor Performance	**Government Complaints**

Table 7. Base D Construct Summary Table

AFCESA: Utility Prices and Deregulation

As stated previously, clarification issues that could not be answered at individual installations were resolved at headquarters AFCESA. The team in the utility litigation section of AFCESA studies the utility industry: restructuring initiatives, utility prices, rate trends. Additionally, this team, along with other agencies, maintains contact with utility providers, legislators, military installations, public utility commissions, and other agencies to discuss utility issues and to advocate for the Air Force benefit as required. Consequently, the case analysis included clarification discussion with this team to resolve

any questions regarding deregulation or utility pricing in the states of the installations that were evaluated.

Deregulation

AFCESA believes that the success of electric deregulation has not been fully realized. The state of Texas has its own grid, excess generation, supply was greater than demand, state backing, but it is not working – rates are not decreasing. This is the state in which AFCESA thought deregulation would succeed. Deregulation lowered rates in the New England states but only by 1.2 percent. AFCESA projects that perhaps when California discovers a way to get deregulation to succeed – April 2002 at the earliest – and all of the California contract issues are resolved, then and only then will deregulation work. Yet, AFCESA predicts that the country is three to five years away from seeing deregulation as a success and seeing lowered utility rates in California. Once that happens, then the rest of the states will follow. The only exception is Texas which has always been its own island. The competitive generation problem needs to be resolved.

On the other hand, gas deregulation helped consumers. Since 1986, the Air Force has saved $6 to 8 Million each year in gas costs from well and transport to any location in the country. Eventually electricity may help consumers also. Things like the regional transmission system will help. The failure of Texas is what confounds AFCESA's utility estimators due to the balanced system of supply and demand; competition should have worked.

Utility Prices and Trends

Although real time pricing will still be working in some areas in the country, real time pricing (RTP) will not be optional in California. California rates are still going to go higher, but the state is going to devise an alternative to RTP. Additionally, local utility companies like the one servicing Base B may have considered instituting a flat rate billing structure for several reasons. If the company uses time of use, variable, rates, then they have to take more time metering, more time administering changes, and more time monitoring equipment. Yet, with a flat rate billing structure, there is less metering and administration. This may be best for a company that has adequate generation.

The Air Force predicts utility rates by taking OMB Budget numbers from the Defense Energy and Support Center futures and securities market at Fort Belvoir. They compare these numbers to the Department of Energy's long-range forecasts for all utilities. Taking into account all variables, such as weather changes and OPEC agreements, when making projections, AFCESA believes that Base D's local utility provider will receive all of the rate increases requested including the 4.5 percent affecting Base D.

Base E

Base E is located in Region 6. Base E actually has four energy contracts, three with savings payback to the government, but only two of these contracts are ESPCs. Those two ESPCs are formal TOs under the Regional 6 main contract. It is interesting to note that the contract that is not a savings contract is a common energy conservation effort found at the other bases, Energy Monitoring Control System (EMCS). Although

this EMCS contract is not a savings contract, it was able to establish to operate and maintain the system for $377,519 for a base plus four option years. The other non-ESPC contract had a savings for the government. This contract was solicited and awarded by another installation and then administered by Base E. This contract was for Retrofit Lights in the amount of $6,026,323.04. The dollar amount appears high for a lighting retrofit contract. However, this contract, awarded in December 1993 was originally for $1,038,588. Modifications were added to the contract per a memorandum that was included in the file from AFCESA:

> "The intent of the SES legislation was to take advantage of technical expertise in energy efficiency and conservation that does not exist in most federal organizations, and also take advantage of the private financing methods authorized by the law…Again, the determining factor is … rather will it save energy, specifically electrical energy." Joe Price, 24 August 1994

Deregulation

Legislation restructured electric utility laws in this state in May 1999 (EIA, 2002). Pilot programs began in 2001, but retail competition opened for all January 2002 (EIA, 2002). In turn, Deregulation is active in this state but has not had an effect on utility prices.

Utility Prices

Base E is in a coal burning region, but the local utility provider uses some gas to generate electricity. The utility rates were fluctuating due to the gas during the twelve months prior to the case analysis visit. For example, in October 2000, the utility rate was $3.79 per kcf, but, in January 2001, it was $8.90 per kcf. Then it jumped back down to $3.00 per kcf June 2001.

Savings

Base E has metering on some of its individual projects, but it is not in all areas. So the ESCO is stipulating the savings. The base civil engineers contend that they cannot separate the ESCO's projected savings from Base E's separate savings initiatives because of the complications of not having individual metered buildings. Furthermore, engineers commented that with the number of equipment problems that the ESCO has been responsible for causing, the government is not receiving any savings from ESPC initiatives but instead is incurring a cost.

Contract Management

Fortunately, this base performed two noteworthy actions. First, before problems with the ESCO occurred and before signing either TO, Base E included a "SHORTFALL CLAUSE" in its TOs:

> PAYMENT OF SAVINGS SHORTFALL
> As authorized by clause H-17 of the basic contract, the Government shall recover any savings shortfall in the form of a lump-sum refund payment directly from the Contractor. The Contractor shall remit to the Government an amount equal to the savings shortfall (if any) within thirty (30) days of completion and acceptance of the annual verification of savings. In no event shall the Government recover, in whole or in part, such savings shortfall by reducing the fixed monthly payments owing under Exhibit C or assert a right of setoff or counterclaim against its obligation to make full and timely payments under Exhibit C.

This clause does two things. First, it treats the contractor shortfall of savings not as a temporary payment to the Government, a payment which only delays future contractor payments. It specifically labels the savings shortfall as a refund ensuring that the ESCO is fully aware that the total value of its contract has not been delayed due to a failure to achieve savings; instead the total value of the contract has been decreased and reimbursed to the government. Secondly, by recovering the shortfall in the form of one lump-sum

payment rather than applying the shortfall to future payments, the government has control over the fund disbursement – as long as annual reconciliations are performed well before fiscal year end.

Additionally, Base E was impressive in the manner in which it handles its problem with its ESCO and sought assistance. The solutions had yet to be discovered during the case analysis visit. However, contract files illustrated constant requests to outside agencies such as AFCESA requesting assistance in reviewing TOs and advising with ESCO problems.

Contractor Performance

Examples of equipment and performance problems can be found in the numerous memorandums in the contract files. The government civil engineers would explain to the contracting officer that the ESCO was procuring 15 horsepower pumps rather than the 20 horsepower pumps promised in the material submittals. After being notified of the error, the ESCO would comment that the 15 hp motors are appropriately sized but will be replaced to alleviate any concerns. In January 2000, the ESCO begins sending e-mails to the contracting officer informing her that these concerns that were delaying acceptance were creating Interest During Construction (IDC) expense. On 10 March 2000, the ESCO stated that the government would delay the contractor an additional 35 days, because of its failure to approve the pipe routing plan. On 25 April 2000, the ESCO stated that the government has now delayed the contractor a full 35 days for its failure to approve the ESCO's pipe routing plan; therefore, the ESCO threatened monetary charges will be claimed. It was later discovered that the pipe routing plan was the most expensive

direction to undertake, and the government engineers submitted a design for the ESCO that proved to be less expensive for Base E. On 26 May 2000, the ESCO stated that although the government has approved a pipe route, the total delay was over 40 working days. In turn, the ESCO stated that its construction schedule had been impacted and it needed a schedule delay until 20 November 2000. Yet, by 31 July 2000, it was the government who began finding several other discrepancies in the ESCOs other ECPs. These included incorrectly installed equipment (check valves installed backward and upside down and piping installed incorrectly). These problems continued to occur well past September as the ESCO stated that slow downs would incur exponential interest for the government. Yet, significant problems failed to be corrected:

> "(ESCO rep), as part of our reporting procedure this note is to inform you that last Weds night the Thermal Energy Tank failed to recharge. This is a significant failure. We believe this to be a design flaw that may impact anticipated energy savings if not corrected."

This problem failed again the next night and became a reoccurring problem. It was discovered that the ESCO might have been making changes to the system without notifying the workers in the plant. On one of the problem days, the civil engineers forecasted major energy savings losses due to the energy demand record. They stated,

> "(Base E) expects to set a new energy demand record today if the (ESCO's) pumps installed are not fixed/replaced. If so, ALL energy savings for the year will be lost. Note that CE informed the contractor several times in the past week about the pump problems. On 15 May 01, the COR approved material submittals to have two (2) new pumps installed…"

TO#1 (Y0001) is for Military Family Housing Radio Frequency (RF) Controllers in the amount of $446,474 for a payback period of 15 years. The original Phase II report was submitted for this energy conservation measure (ECM) effort August 1999, and the second revision was submitted April 17, 2000. Base E took a significant amount of time

accepting its phase II report. However, it involved more than one ECM. Construction was scheduled to start and end in January 2001, but as of October 2001, the construction had not been accepted and payments had not been made. The engineers began reviewing the documents and discovered that the utility baseline was unknown and questioned how the ESCO would be guaranteeing savings to the government. However, this was not the reason for acceptance delay; the engineers began questioning equipment quality after discovering equipment failures in other areas.

TO #2 (Y0002) is for a Thermal Energy Storage System and a Variable Volume Chilled Water Pumping System. This TO totals $2,873,529.02 and makes 206 contractor payments. The first payment began in July 2001, but in September, the government civil engineers determined that the payments needed to stop. The government engineer in charge of the project explained that the ESCO is required to submit a quarterly report in addition to the annual report. This report gives the government an updated status of the quarterly and cumulative savings. Because this requirement has not been filled, he believes the contractor should not be paid. Furthermore, he believes that the utility baseline is also questionable on this TO. Because of these contentions, communications have degraded, and there were two outstanding claims against Base E from the ESCO during the case analysis visit.

Base E Summary

The electric utility industry has been deregulated, and utility prices have been fluctuating but not as a result of this restructuring initiative. Engineers state that the issue of savings may be clouded by more than contractor stipulation. The failure of equipment

and poor quality parts may be costing the government money instead of reducing utility bills. Contract management is not a concern. Base civil engineers and contracting personnel have asked for assistance, but teamwork between the two squadrons is evident, and documentation of contractor irregularities is maintained. Contractor performance is perceived by both contracting and civil engineers to be questionable.

Base E Construct Summary Table

Deregulation	**Yes**
Utility Prices	**Fluctuating**
Savings	**Stipulated**
Contract Management	**Documentation**
Contractor Performance	**Government Complaints**

Table 8. Base E Construct Summary Table

Cross-Case Analysis

Pattern-matching illustrates a link between the constructs of deregulation and utility prices. In areas where there is no deregulation, utility prices appear stable. Utility prices are volatile or fluctuating in locations where deregulation has been legislated. However, Base E's utility prices were fluctuating as a direct result of the natural gas prices; many of the electric plants are natural gas fired. In turn, there may or may not be a link between deregulation and utility prices. However, the cross-case analysis should illustrate that there is a pattern of stipulated savings and of government complaints of contractor performance. Overall, contractors are stipulating the guaranteed savings to the

government. Furthermore, the government perceives a problem with contractor performance (reference Table 9).

Base	De-regulation	Utility Prices	Savings	Contract Mgmt	Contractor Performance
Base A	No	Stable	Stipulated By Contractor	No Documentation	Gov't Complaints
Base B	Yes	Fluctuating	Stipulated By Contractor	No Documentation	No Complaints noted
Base C	Yes	Volatile	Stipulated By Contractor	Documentation	Gov't Complaints
Base D	No	Stable	Metered	Documentation	Gov't Complaints
Base E	Yes	Fluctuating	Stipulated By Contractor	Documentation	Gov't Complaints
Overall	Mixed	Fluctuating	Stipulated By Contractor	Mixed Results	Gov't Complaints

Table 9. Cross Case Analysis Pattern Matching Table

Cross-Case Analysis – Construct Summary

Deregulation

Deregulation of electric utilities was in effect at three of the five bases studied in this thesis. In deregulated environments, utility prices have a greater potential to increase initially; Base D is the exception. However, despite the potential increase in utility prices from deregulation, deregulation has minimal affect on ESPCs at this time. At Base A, it was discovered that deregulation might not have an effect for the next three years due to legislation delaying a vote on the issue until 2004. In Base B, it was found that

deregulation might have eventually become an issue if the utility provider had changed from a variable rate billing structure to a flat rate service. However, this was not the case. At Base C, deregulation caused volatile utility prices in the state. One of the Deregulation was studied in cases that were in states affected by electricity deregulation and in states without electric deregulation initiatives. In both environments, deregulation was shown to have a potential to increase prices when it was in effect or if it ever came into effect except in the case of Base D. However, despite these potential increases in prices that deregulation may have caused, deregulation has minimal affect on ESPCs at this time. At Base A, it was discovered that deregulation might not have an effect for the next three years due to legislation delaying a vote on the issue until 2004. In Base B, it was found that deregulation might have finally become an issue if the utility provider had changed from a variable rate billing structure to a flat rate service. However, this was not the case. At Base C, deregulation caused volatile utility prices in the state. One of the TOs has a set base rate, and the other TO has a rate that is not set. In turn, deregulation could possibly be studied to determine the effect on ESPC. At Base D, deregulation may not have an impact for another ten years. At Base E, deregulation has been implemented in the state, but the restructuring initiative does not have a direct impact on the payback of ESPCs. If deregulation or any factor affected ESPCs, Base E does not permit contractor payment extensions due to the Shortfall Clause. Overall, just as the bases have mixed results of deregulation status; those states that have been deregulated have been affected differently by the legislation. Furthermore, although Base C, Base B, and Base E have fluctuating or volatile utility prices, the issue of stipulated savings, addressed

later, creates a barrier from studying that effect. In order to study the effect of deregulation on savings, savings must first be assessed.

Utility Prices

Over the past year, utility prices at the bases studied have ranged from stable to volatile. In some areas, utility prices have been stable and unchanged for over ten years. In other areas, utility prices have reported seasonal price spikes and gradual price increases. In other areas, utility prices have been volatile and have created national attention. Whether these utility prices affect the guaranteed savings of ESPCs cannot be assessed due to the type of measurement and verification that is performed to report the annual government savings.

Base A experienced low and constant utility prices. This is in contrast to the fluctuating utility prices of Base B or the volatile utility prices of Base C. Yet, Base D has had constant, stable utility prices for over 10 years. Base E's electric utility prices fluctuated due to the price spikes in natural gas, which fueled some of the electric generation plants. As seen in the deregulation construct, no pattern can be seen across these bases. There are mixed results in the trends of utility prices.

Savings

The contractor stipulates the annual government savings at four of the five installations. Often, the energy conservation effort is performed at a facility without an individual meter. In turn, the savings cannot be individually assessed. The contractor stipulates in a quarterly, then an annual report, how much savings the energy conservation effort has saved the government. The contractor is able to stipulate these

savings by measuring the equipment in place to ensure it is functioning or verifying that the conservation measure has been completed. Yet, this stipulation does not ensure that the utility bill reductions result from the energy conservation measure itself. Only metering devices have been able to meet this objective at this time as found at Base D.

Base A had a possible overlap of savings between two energy measures. Yet, this overlap was difficult to assess due to the issue of stipulated savings. Base B stipulates its savings and has delayed contractor payment for over six months to ensure effective equipment monitoring devices were in place. Base C stipulates it savings and has concerns regarding the second annual reconciliation of the first TO. Base D meters its savings but believes that the government may not achieve the true savings guarantees due to the "hidden" cost of maintenance and operation costs. Base E stipulates its savings but believes that there could be no savings for the government due to equipment problems, failures, and delays. Across each case, a pattern can be seen matching savings concerns to ESPC management. The cross-case comparison illustrates that installations question the concept of stipulated savings. Furthermore, stipulated savings impacts the government's ability to assess the guaranteed savings loss that results from poor contractor-installed equipment or performance.

Contract Management

In two installations, ESPCs were not treated as contract files. Items such as Price Negotiation Memorandums, Site Visit Reports, Memorandums for Record, etc. were absent. The ESPCs were considered such unique contracting instruments that management over these entities appeared confused. The contract management at Base C

on the other hand, appeared the textbook example of contracting and engineer management excellence. Here, the Contracting officer and civil engineers worked as a team to manage the ESPC like a construction-service hybrid contract using standard Federal Acquisition Regulation techniques. As a result, contract paperwork was apparent, internal and external communication was documented, and contractor conduct was managed.

Base A mislabeled the ESPCs confusing these contracts with utility privatization. In fact, the contract administrator was sent to a utility privatization class and was never given ESPC training. Base B understood ESPCs but used a different filing technique than normal contract procedure. Additionally, Base B treated these contracts as contracting instruments that did not require site visit reports or pricing memorandums. Base C exhibited ESPCs in such a way that their filing method was sent to AFCESA as an example. Additionally, the correspondence between squadrons and the contractor was documented. Base D also understood ESPCs and filed these contracts using standard contracting procedures as recommended by AFCESA and as seen in Base C. Base E understood ESPCs but needed clarification on some issues. This clarification was self discovered and sought by the contracting office and civil engineering team. Overall, Base C was a textbook example, but the other installations could benefit from additional training. In some installations, however, that additional training was required to illustrate filing methods and to standardize ESPC with other contracting instruments. A cross-case comparison in this construct shows only mixed results.

Contractor Performance

Only Base B had no complaints of contractor performance. Yet, this may be due to the fact that Base B partnered with the ESPC contractor shortly after defaulting their HVAC contractor. All other bases had some complaints of contractor problems which many of the government civil engineers believed to be beyond questions of poor performance but a question of purposeful misconduct.

For example, Base A's TO has not begun construction. Yet, the ESCO used its employee's influence to affect contract operations. The ESCO introduced the employee over e-mail as the general officer familiar with the installation and as an acquaintance of the installation commander. The ESCO used this influence to schedule meetings, to shape the project's timeline, and to influence project scope although that is not the responsibility of an operational contractor. Base C and Base D had minimal complaints of contractor performance amounting to disagreements in reports or perceived problems in quality. However, it was Base E that had documents illustrating a history of contractor negligence and failure to provide contractual promises. As noted in the analysis, material submittals would promise 20 hp engines. The contractor would install 15 hp engines. The government engineers would experience difficulties or would inspect and perceive a problem with the lesser quality. These issues, along with others such as parts installed upside down or improperly, would cause the government engineers to inspect the energy conservation measures. During these inspections, the ESCO would threaten to charge interest for construction delays. Overall, a cross-case match of problems cannot be discovered in regards to contractor issues. However, a pattern of government complaints

of contractor performance problems can be found. At each installation, except Base B, specific statements were made regarding the contractor's performance and not just the performance itself. Consequently, the pattern match suggests that the perception of poor contractor performance, if not the reality, exists.

Summary

Overall, there seems to be a consistent issue with stipulated savings and how savings are tied to measurement and verification. Additionally, there were a couple of offices that needed AFCESA assistance in ESPC training and/or techniques. That training could include the contracting officer's right to treat the ESCO as a standard contractor limited in its ability to control the contract environment. Contracting officers were unaware of their right to penalize or to terminate these types of task orders due to their link to regional contracts and the political push to implement their use.

V. Discussion

Introduction

The primary purpose of this thesis effort was to discover the possible effects of the deregulation of the energy industry on the savings of ESPCs. Through in-depth case study analysis and cross-case comparison, it was discovered that deregulation had a minimal effect on the savings of ESPCs. The effect of deregulation can be countered by actions such as the "Shortfall Clause." This clause would allow factors, such as deregulation, that retard savings and affect the payback, to credit the government in one lump sum rather than extending payments that violates legislative contract term limits and incurs more interest expenses. This clause was explained in depth in Chapter Four under Base E description. It is recommended that this clause should be encouraged as long as annual reconciliation and contractor payment could be accomplished well before the end of the fiscal year cycle. This recommendation offers a solution to savings shortfalls caused by deregulation or other unexpected events.

Although deregulation remained the focus of this thesis effort, several factors illustrated influence over the management of ESPCs. Four of the five bases studied had savings that were guaranteed by contract but stipulated by contractor. This factor affected the base civil engineers' ability to effectively measure and verify government guaranteed savings and hence efficiently manage ESPCs. Two of the five bases experienced problems with basic contract filing techniques due to confusion with the nature of these contracting instruments. Those installations believed these documents

were exempt from standard contracting procedures. In turn, these bases ineffectively managed ESPCs due to their failure to understand these contracts. Furthermore, all installations except Base B experienced difficulties with contractor performance. These installations discovered faulty equipment or missing parts, errors in reports, and delayed schedules. Accurate measurement and verification and effective management is key in an environment where quality is questionable. Consequently, the management of ESPCs is a balance between savings verification, contractor performance, and contract management. If contractor performance exhibits quality results, savings verification should not be as critical. If stipulated savings must be critically reviewed and evaluated, resourceful contract management communication, documentation, and follow-up activities including contractor penalties. In sum, each case has exhibited a failure in at least one of these areas: contractor performance, contract management, or savings verification.

Recommendation

The cross case comparison illustrates that there may be several areas of concern surrounding ESPC savings. The external utility environment is experiencing a period of uncertain utility prices. The local base contracting and civil engineering staff complains of measurement and verification confusion and contractor performance problems. Before each base implemented task orders at its individual installation, scenario-based planning, described by Courtney et al in "Strategy Under Uncertainty," should have been employed by the agency responsible for supervising these contracting instruments (Courtney, 1997:82). With scenario-based planning, the individual ways to handle various issues

could be bundled together to control the residual uncertainties. Stipulated savings makes measurement and verification difficult to link the ESPC energy conservation measure to the reduced utility bill. Volatile utility prices, such as the prices in the locality of Base C, not only raise prices but also lower utility bills possibly creating a shortfall of savings. Ineffective contract training will allow an installation to believe that ESPCs are just another utility privatization effort, and these contracts may not be treated like in-house contract documents. At present, Base C has textbook contract management. Base D uses ESPC efforts only at metered facilities to help ensure guaranteed savings. Base E writes a Shortfall Clause into its contracts preventing any extension or confusion in contractor payments. If scenario-based planning had been employed, it is possible that the controlling organization could have recognized the residual uncertainties. In turn, each installation could have implemented the individual techniques as a consolidated unit. In other words, rather than only Base D using metered facilities and Base E using the Shortfall Clause, all bases would know to install meters at facilities using ESPC measures or implement ESPC measures only at individually metered facilities. Each installation would have a shortfall clause. Each installation would have contract files that mirrored standard Federal Acquisition Regulation contract files.

As a contracting professional, each Contracting Officer is the designated business manager of an installation as each acquisition reform initiative is adopted. Each professional must consider every new acquisition or contract as a new business enterprise to which the installation may possibly commit. In turn, scenario-based planning, or in-

depth what-if analysis, should be undertaken before each endeavor into a new venture. This may prevent a reoccurrence of the problems found in this study.

Scenario-Based Planning

Scenario-based planning can be used in future specialty contracting arrangements in addition to the ESPCs researched. The AFCESA utility litigation team exhibits legislative shaping. However, individual installations implemented various strategies when contracting ESPCs. Base A did not use a strategy at all when implementing ESPCs. Base B chose to adapt and use ESPCs as contract vehicles to obtain improvements on base despite the short term or long term costs or risks. Base C adapted to the ESPC regulations also. Base E demonstrated an attempt to shape the contract environment with its Shortfall Clause. Base D chose not to shape but rather to adapt to an uncertain environment by using the ESPC only on metered buildings. Actions such as these and others are good examples, but they are just individual pieces – not enough to create a shaping strategy. Overall, these installations used adapting strategies. As a whole, under the direction of an agency such as AFCESA, more effective shaping strategies could be seen at individual bases.

Future Research Efforts

Energy Savings Performance Contracts are diverse contract instruments open to a variety of research topics. Uncovered during the case studies was a strong need for ESPC contract management training. AFCESA has offered and conducted many training sessions and has discovered that the training is not being attended, understood, or implemented. Other than administering the contracts themselves, AFCESA may be open

to a research effort to study possible training approaches or a research effort to determine the barriers to implementing the knowledge learned during these courses. Additionally, the case analyses also revealed that at a few of the bases, the engineers might not be truly trained on how to evaluate the ESCO's proposal. It may be a worthwhile research effort to determine the necessity of training the engineering personnel on inspecting and evaluating the ESCO's proposal, i.e. whether personnel need a course in evaluation beyond the basic ESPC training course. Furthermore, research may be conducted into the performance of the measurement and verification system itself. This research would need to be conducted by a researcher with an engineering background with familiarity in utility, electrical, and environmental systems.

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14. ABSTRACT

Energy Savings Performance Contracts (ESPCs) originated to accomplish several objectives: (1) to meet energy efficiency goals mandated by executive orders and energy policies; (2) to improve federal government facilities using funds allocated for utility bills; and (3) to receive repayment of expenditures through energy savings reflected in reduced utility bills. In ESPCs, the contractor guarantees savings to the federal government agency. 10 CFR 436 limits the time necessary for payback. However, this regulation and others were written prior to the deregulation of utility companies. This theory is based on the underlying premise that the contractor payback is a direct result of the energy savings. The population of study is all of the Air Force ESPCs. The sampling frame used will be the ESPCs and their task orders (TOs) listed in the Air Force Civil Engineering Support Agency (AFCESA) database. The primary unit of analysis will be the individual task order. Data will be collected from interviews, observations, conferences, archives, and other task order related documents. Using case study methodology, contract financial data, energy rates, contract decision memorandums, contract clauses and statements of work, observation, open interviews, and other relevant meetings and materials will be evaluated to determine whether deregulation has an effect on contractor payback and what the effect entails.

15. SUBJECT TERMS

Contracts; Energy; Energy Savings; Deregulation; Stipulated Savings; Energy Savings Performance Contracts; ESPC

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